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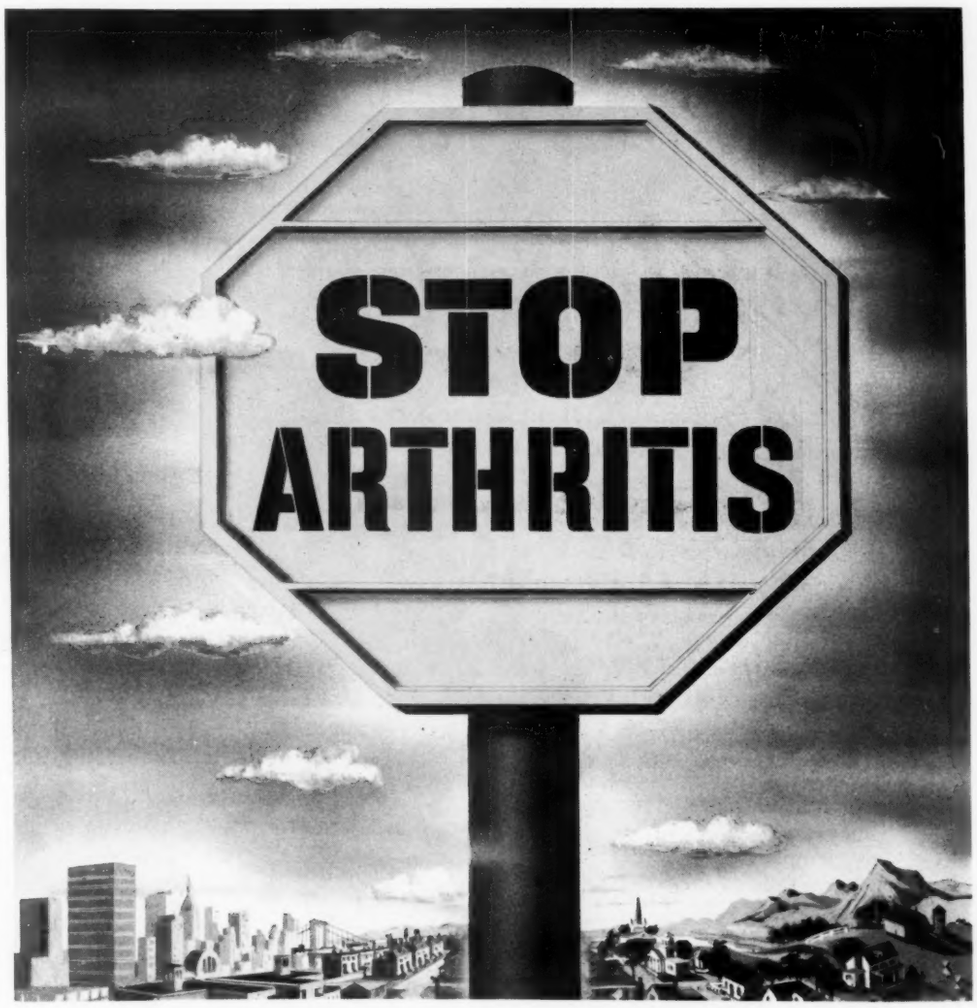

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*Pratt, R., & Dufrenoy, J.: Texas Rep. Biol. & Med. *12*:145, 1954.

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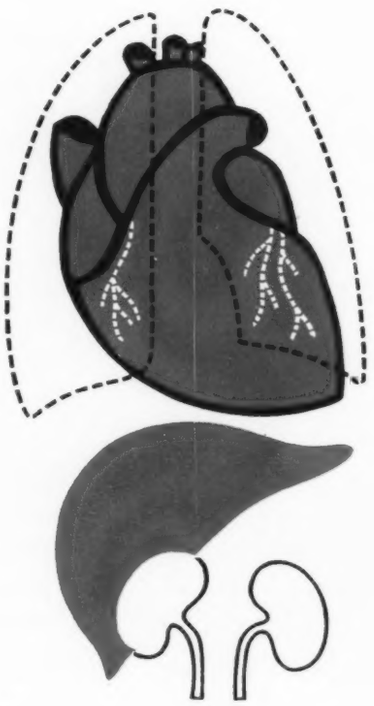

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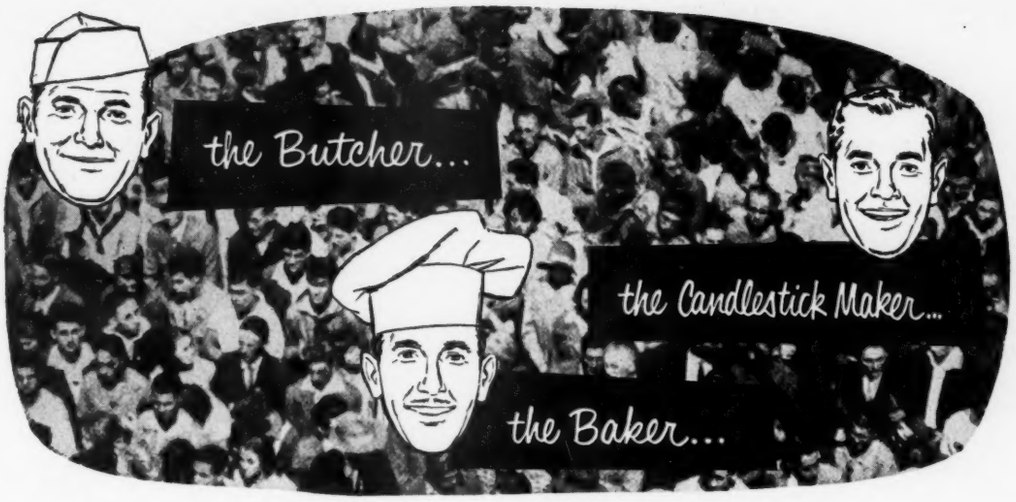

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*Daily dietary allowances recommended by National Research Council for a sedentary man (154 lbs.)
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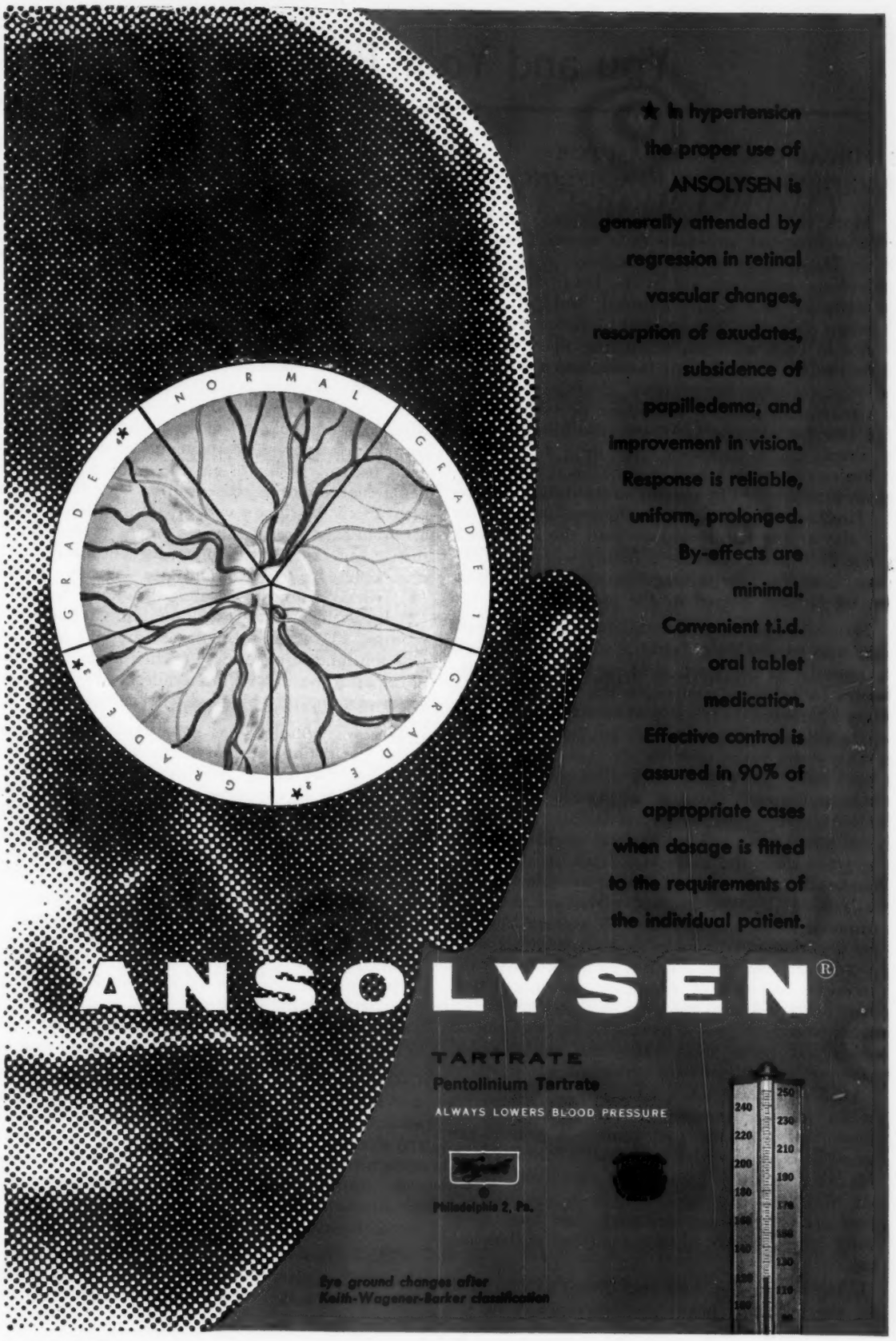
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MEDICAL CARE PROGRAM FOR RECIPIENTS OF PUBLIC ASSISTANCE

More than 150 thousand Michigan residents receive financial assistance each month from the State Department of Social Welfare in the form of old-age assistance, aid to the blind, aid to the permanently and totally disabled, and aid to dependent children. The amount of assistance given varies in each instance, depending upon the expenses of the individual or family, and upon other income available for support. Seventy dollars is the maximum monthly allowance provided under the law for old-age assistance, the blind, or the disabled, unless receiving care in a hospital or convalescent home when an additional $10 maximum is possible. The maximum assistance granted to families with dependent children varies with the size of the family group, with the maximum grant $110 per month for a family with two children, which is the average number of children among families helped by the program.

Medical expenses of the elderly or disabled persons who receive these forms of assistance are just as essential as the food, clothing, and shelter expenses included in computing the amount of assistance granted. This is particularly true of old-age assistance recipients, whose average age is seventy-seven years, with 25 per cent of the group more than eighty years old. Recognizing these needs in the cash payment to the client required by law is complicated by several factors: (1) There is not much room left for medical requirements in the grant since the average old-age assistance allowance without medical care provision already totals $57; (2) the medical allowance must be computed in such a way that an average amount over a period of months is recognized rather than an amount changing each month, because the administrative cost of changing the amount of payment each month for over 76 thousand elderly clients would be prohibitive; (3) the recognition of medical needs must take into consideration other public medical care programs administered by local welfare agencies, who may also be giving aid for medical expenses to the same group of clients; and (4) the cost must not exceed the money available within existing appropriations. This last element is made more significant by the fact that a one dollar increase in the average grant for the old-age assistance case load alone would cost the state almost a million dollars per year.

Using the old-age assistance group as an example, the problems have been approached in the ways described below.

Non-Chronic Medical Needs.—For most old-age assistance clients, $2 per month is included in the grant for incidental medical care such as occasional visits to a physician, drug store supplies, and similar needs. This allowance does not require a physician's statement of need or the identification of a specific chronic condition. This $2 allowance is not granted a person receiving hospital or convalescent home care, or to a person granted a chronic medical allowance described below.

Chronic Medical Needs.—This type of medical care allowance is the one most familiar to the Michigan physicians whose patients receive assistance. It is given to recipients of old-age assistance, aid to the blind, aid to disabled and aid to dependent children, based upon a written statement from the doctor called "Verification of Need for Medical Care." This statement is intended to justify the cost of treatment for chronic medical conditions by determining for agency records (1) what diagnosis creates the need for care, (2) if the need for care will continue at least three months, (3) what the cost of care has been and will continue to be, and (4) when a new appraisal of medical need will be required. For purposes of discussion, this plan will be called "Plan A."

Misunderstanding has sometimes occurred because the county bureau of social aid which administers the old-age assistance program locally has been unable to meet all of this medical need within the maximum monthly grant provided by law. This also may happen when the recent cost of care has been less than the future estimate of cost, and further clearance between local office and the physician bcomes necessary to determine whether the patient has had a drastic change in health which requires additional medical care. Understandable caution on the part of the doctor to predict the duration of needed treatment has also led to some problems such as frequent requests by the bureau for new forms from the doctor to redetermine current need for medical expense.

The Department and physicians are agreed that any attempt to solve these problems by requiring additional detailed explanation on the forms by the doctor would be undesirable. Because of the recognized need for a simpler method, however, some county offices have been experimenting with an alternative procedure in conjunction with local medical societies who have approved the project.

This experimental plan will be called "Plan B." Under this plan the procedure for determining the amount to be included in the budget for medi-

(Continued on Page 242)

Meat...

and the Therapeutic Protein Dietary

For many years clinicians and surgeons have recognized the therapeutic value of the high protein dietary.

In more than normal amounts, protein is essential in the treatment of many diseases characterized by hypoproteinemia[1]—nephrosis,[2] sprue, pellagra, chronic colitis, certain liver afflictions,[3] anorexia of diverse etiologies. High protein intake helps to stabilize tissue protein in diseases in which protein catabolism is increased, such as hyperthyroidism and protracted high fever. Dietaries high in protein promote wound healing in the surgical patient and speed convalescence.[4] Sufficient protein ingestion constitutes a protective measure in the geriatric patient.[5] Large amounts of protein are required to satisfy the growth and other metabolic needs of the pediatric patient.

Meat provides large quantities of protein highly effective in the body economy—tissue growth and maintenance, formation of antibodies, enzymes, and protein hormones, and regulation of fluid balance. It also supplies valuable amounts of B vitamins and essential minerals including iron, phosphorus, and potassium. Appeal to the palate, easy digestibility, and its nutrient contribution make meat an important component of therapeutic diets.

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1. Taggart, H. A.: Protein Metabolism in Relation to Nutritional Aspects of Medical Diseases, Pennsylvania M.J. *54*:339 (1951).
2. Marquardt, G. H.; Cummins, G. M., and Fisher, C. I.: Blood Protein Replenishment in Treatment of Nephritic Edema, Quart. Bull. Northwestern Univ. M. School *26*:140 (1952).
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4. Kekwick, A.: Protein Deficiency in Surgical Patients, Ann. Roy. Coll. Surgeons England *7*:390 (1950).
5. Stieglitz, E. J.: Nutrition Problems of Geriatric Medicine, Report of Council on Foods and Nutrition, J.A.M.A. *142*:1070 (Apr. 8) 1950.

The Seal of Acceptance denotes that the nutritional statements made in this advertisement are acceptable to the Council on Foods and Nutrition of the American Medical Association.

ACCEPTED COUNCIL ON FOODS AND NUTRITION AMERICAN MEDICAL ASSOCIATION

American Meat Institute

Main Office, Chicago... Members Throughout the United States

MEDICAL CARE PROGRAM

(Continued from Page 240)

cal care is based on expense actually incurred instead of using (as under Plan A) the future cost as estimated by the medical practitioner. The method for establishing the original need for chronic medical care as well as cost for treatment is similar to Plan A. However, after the first three months during which the client receives an allowance based upon the doctor's estimate, the allowance is based upon actual expense. The client submits at the end of each month a form "Report of Medical Expenses" showing the amount he has spent for medical care. The information on this form is inserted by the doctor's office each time the patient is seen, and by the druggist when medicine is purchased. This informtion is used by the bureau in determining the amount to be included in the next three months' period for medical care.

There are problems in Plan B, such as the need for a more detailed statement from the doctor when there is a sudden drastic change in health greatly increasing medical costs beyond that justified by averaging past expenditures. The Michigan Social Welfare Commission is currently reviewing the results of these experiments to determine whether they can practically be extended for use throughout the state.

Special Medical Needs.—In addition to either of the types of medical care mentioned above, a patient may need glasses or a prosthetic device. To include an allowance for such purchases usually means prorating the expense over several months' payments because of maximum grants. Such an expense would usually require a separate medical verification of need and cost regardless of the procedures discussed above.

Special diet is sometimes recommended by physicians. It may only be considered in computing the amount of grant if (1) it is one of a few types of diets which have been found to actually increase the cost of food, and (2) the client is furnished with a diet list or daily menu from which the bureau may determine the diet cost.

The law does not permit the Department to restrict the manner in which a recipient spends his grant. Furthermore, the law prohibits the Department from interfering with the patient-physician relationship. For those reasons, although the physician is asked about the amount of cost, it does not mean that he can be assured payment from his patient, even when the money is included in the old-age assistance grant. And there are many conflicting viewpoints concerning desirability of state interference between the doctor and patient over payment of the medical bill.

From time to time, there has been discussion of the giving of medical information by a physician without violating the confidence of his patients. Usually, this does not become an issue because the patient frequently brings the proper form to the doctor's office with a request that the information be given to enable the patient to secure an allowance for medical care. Each applicant for assistance signs a form which states, "I empower the bureau to obtain such information from other sources as may be necessary to establish my eligibility for assistance." This has been interpreted by several attorneys as constituting a release for the securing of medical, as well as financial and social, information bearing upon eligibility. Some physicians may not be aware that both federal and state laws restrict the bureau's use of information secured in this manner to purposes connected with the administration of public assistance. The bureau has an obligation to protect confidential information concerning recipients as well as a responsibility to help them meet their medical needs.

HEALTH EXAMINATION

A committee of the Michigan State Medical Society is now preparing papers which are being presented in THE JOURNAL again calling attention to the need for more thorough periodic health appraisals of patients. The physician's own family should be included in those patients. Each medical family has been urged to select a family physician. Many items have appeared, but still physicians, like their patients, fail to secure the early diagnoses necessary to ward off preventable calamaties, malignancies and heart conditions, fields in which the record of medical families is not any better than the general public.

Herbert F. Dowling, M.D., Department of Medicine, College of Medicine, University of Illinois, has published a paper entitled "Physician, Heal Thyself" in G.P. for January, 1955. This is a very well-written paper and should be read by all. He says physicians do not neglect their own health because of too much familiarity with death. They mostly have a healthy respect for it and when some noted man or respected friend dies suddenly of a coronary condition, they rush in for a heart examination.

Dr. Dowling discusses many causes of medical men's ill health: infections, excess radiation, misuse of drugs, vascular disease (he reports a survey of 300 to 308 farmers, laborers, clergymen, lawyers, bankers and physicians with coronary sclerosis—relative percentage 2.5, 2.6, 4.6, 4.6, 5.3, and 10.7). Other conditions are mentioned: peptic ulcer, emotional tension, suicide being most frequent.

The physician has his professional hazards and also the hazards of his social and economic class. He says, "The finger of shame is pointed" at physicians. As the result of a survey on the interval

(Continued on Page 244)

"an effective antirheumatic agent"*

nonhormonal anti-arthritic

BUTAZOLIDIN®

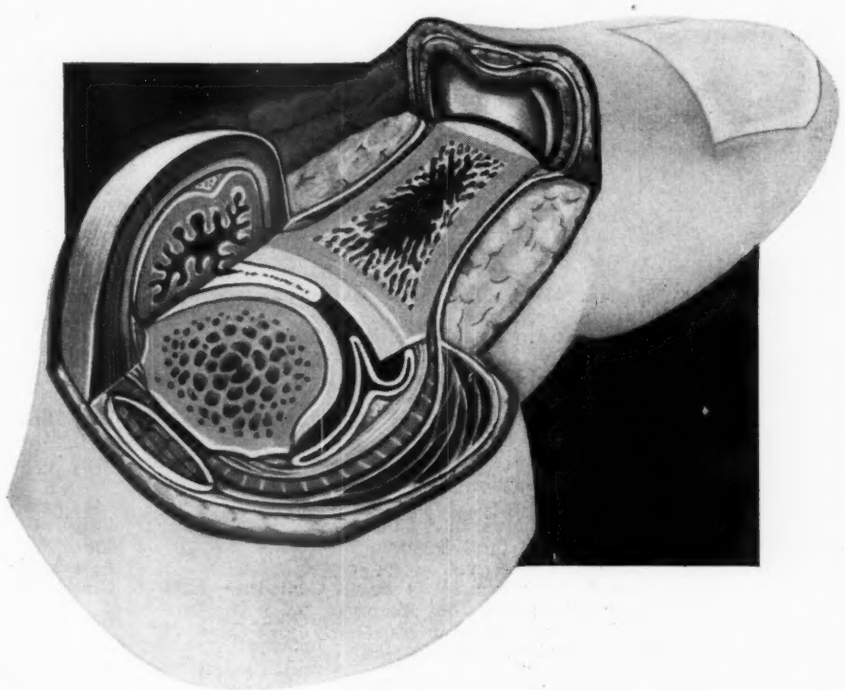
(brand of phenylbutazone)

relieves pain · improves function · resolves inflammation

The standing of BUTAZOLIDIN among today's anti-arthritics is attested by more than 250 published reports. From this combined experience it is evident that BUTAZOLIDIN has achieved recognition as a potent agent capable of producing clinical results that compare favorably with those of the hormones.

Indications: Gouty Arthritis Rheumatoid Arthritis Psoriatic Arthritis
Rheumatoid Spondylitis Painful Shoulder Syndrome
BUTAZOLIDIN® (brand of phenylbutazone) red coated tablets of 100 mg.

*Bunim, J. J.: Research Activities in Rheumatic Diseases. Pub. Health Rep. *69*:437, 1954.



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Division of Geigy Chemical Corporation, 220 Church Street, New York 13, N.Y.

HEALTH EXAMINATION

(Continued from Page 242)

which elapsed from the onset of the first symptoms of a neoplasm until the patient presented himself for examination, seven months in carcinoma of the lung, nine months in malignancy of the gastro-intestinal tract and fourteen months between first symptoms of carcinoma of the prostate and the first examination. "Small wonder only five out of sixty had curative operations."

This one quotation should sufficiently emphasize the problem and the cure. Physicians should have themselves and their families examined as well as their patients. Many hospitals are providing or offering a method of rendering this service.

ARE YOU CERTIFIED TO PRACTICE?

Section 4 of the Medical Practice Law of Medicine—Act 237 of the Public Acts of 1899, as amended, specifically states:

"The person receiving a certificate of registration shall file the same or certified copy thereof, with the county clerk in the county where he resides, and said clerk shall file said certificate or the certified copy thereof and enter a proper memorandum thereof in a book to be provided and kept for that purpose, and may collect therefore a fee of fifty cents for each certificate or copy thus filed. And said county clerk shall, on the first day of each month, furnish to secretary of said board a list of all certificates filed in his office during the preceding month on a blank provided for that purpose, and upon notice to him of the change of location or death of a person granted a certificate, or upon the revocation of the certificate granted such person, such county clerk shall enter at the appropriate places in the record so kept by him a memorandum of such facts; so that the records so kept by said county clerk shall correspond with the records of said board, so kept by the secretary thereof.

"In case a person having thus filed a certificate shall move into another county of the State, he shall procure from said county clerk a certified copy of said certificate, and file the same with the said county clerk of the county to which he shall so remove. Said county clerk shall file and enter the same with like effect as if the same was the original certificate."

PORTABLE ATOMIC X-RAY MACHINE DEVELOPED

A recent television newscast disclosed the federal government is experimenting with a portable x-ray machine weighing only 48 pounds. It utilizes atomic energy and produces a direct print in a matter of seconds without resorting to the use of conventional darkroom and chemicals. A model was demonstrated on the newscast. Continued study is under way to develop the machine so that improved and more minutely defined x-ray pictures can be made.

MEDICAL MEETINGS AND CLINIC DAYS

A list of known medical meetings and clinic days, sponsored by county medical societies and other physician groups in Michigan, follows:

1955		
Spring	MSMS Postgraduate Extramural Courses	State-wide
April 5	82nd Annual Meeting, Northern Tri-State Medical Association	Fort Wayne, Ind.
April 13	Genesee County Medical Society's Tenth Annual Cancer Day	Flint
April 21-23	First Annual Conference on Anesthesiology, Wayne University	Detroit
May 5	Twenty-seventh Annual May Clinic, Ingham County Medical Society	Lansing
May 10-11	Annual Clinic Day and Alumni Reunion, Wayne University College of Medicine	Detroit
May 13	Eleventh Annual Clinic Day of the St. Clair County Medical Society	Port Huron
May 19	American College of Surgeons Annual Symposium on Trauma and Nutrition	Ann Arbor
June 6-10	Annual Session, American Medical Association	Atlantic City
June 7	Bon Secours Hospital Annual Clinic Day	Detroit
June 17-18	Upper Peninsula Medical Society	Gateway
June 27-30	Eighth Annual Conference on Aging	Ann Arbor
August	Fifth Annual Clinic, Central Michigan Committee, ACS Michigan Committee on Trauma, plus Michigan National Guard Medical Personnel, and Medical Society of North Central Counties	Grayling
August 25-26	Coller-Penberthy Clinic	Traverse City
September 26-27	Annual Session of the House of Delegates (MSMS)	Grand Rapids
September 28-30	MSMS Annual Session	Grand Rapids
October	Clara Elizabeth Fund for Maternal Health and Genesee County Medical Society	Flint
October 14	Michigan Cancer Conference	East Lansing
Autumn	MSMS Postgraduate Extramural Courses	State-wide

Additions to this list of meetings are invited by the Editor of JMSMS, in order to make this monthly announcement complete and accurate.

ELECTRON PHOTOMICROGRAPH

Shigella dysenteriae 42,000 X

Shigella dysenteriae (Shiga's bacillus) is a Gram-negative organism which causes bacillary dysentery.

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HEALTH EXAMINATION

(Continued from Page 242)

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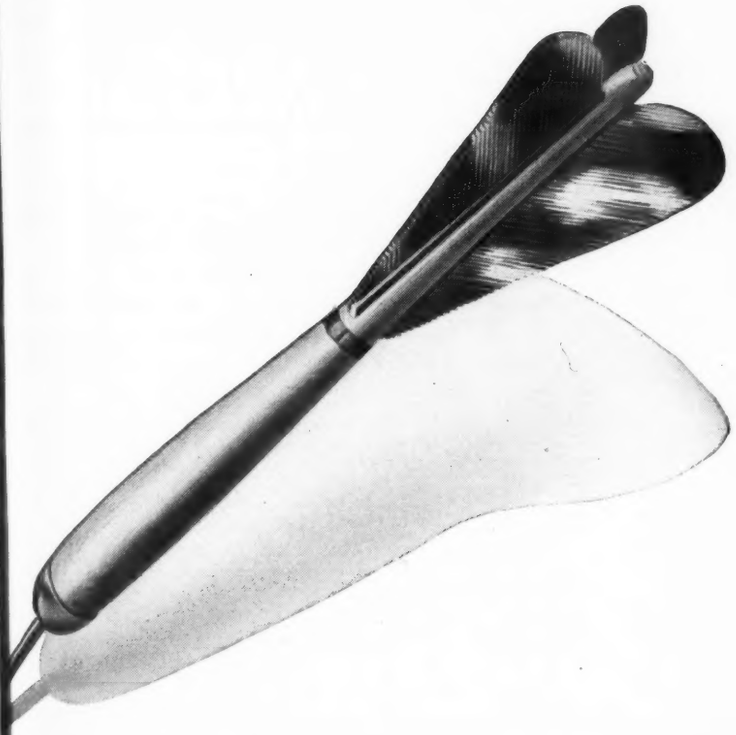

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Pancreatic Fibrosis
Typhus Fever
Sinusitis
Gonorrhea
Bacillary Dysentery
Pneumonia with or without Bacteremia
Bronchopulmonary Infection
Acute Pyelonephritis
Chronic Pyelonephritis
Mixed Bacterial Infections
Soft Tissue Infections
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Urogenital Tract Infections
Acute Extraintestinal Amebic Infections
Intestinal Amebic Infections
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In addition to its true broad-spectrum activity, ACHROMYCIN provides more rapid diffusion than certain other antibiotics, prompt control of infection, and the distinct advantage of being well tolerated by most persons, young and old alike.

ACHROMYCIN, in its many forms, was accepted by the medical profession in an amazingly short time. Each day more and more prescriptions for ACHROMYCIN are being written when a broad-spectrum antibiotic is indicated.

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Heart Beats

"ATLAS OF CONGENITAL CARDIAC DISEASE" REPRINTED

In response to numerous requests from physicians, students, scientific workers and libraries throughout the world, the American Heart Association has reprinted the "Atlas of Congenital Cardiac Disease," by Maude F. Abbott, M.D. (1869-1940). This classic monograph, a critical analysis of 1,000 cases of congenital cardiac anomalies, was first published by the Association in 1936. Long since out of print, it has now been reprinted in a limited edition of 1,500 numbered copies exactly as it appeared originally.

The work of Dr. Maude Abbott, who died in 1940, served to bridge the gap between the previous unsystematic and largely descriptive knowledge of congenital cardiac defects and the present era of precise diagnosis and dramatic surgery. Her systematic study and classification opened the way for the practical developments of the past two decades.

Dr. Abbott published her first major report in 1908, as a section of volume four of Osler and McCrae's *Modern Medicine,* based on 412 cases of congenital cardiac defects gathered from her own material and from the world medical literature. Numerous additional articles appeared through the years. Then, in 1936, came *The Atlas,* a critical analysis of 1,000 cases of congenital cardiac anomalies.

The monograph was published largely at the suggestion of and with the encouragement of Dr. William W. Francis of the Osler Library, McGill University, Montreal, and with the permission of the executors of Dr. Abbott's estate.

The volume, printed by Peter F. Mallon, Inc., Long Island City, is available at a cost of $5.00. Copies may be obtained from the Michigan Heart Association, 4421 Woodward, Detroit 1, Michigan.

ANATOMICAL CARDIAC STAMPS AVAILABLE AS RECORDING AID

Sets of anatomical cardiac rubber stamps are now available at cost to interested physicians to assist them in keeping records of heart patients. The rubber stamps were devised from diagrams in the book "Congenital Malformations of the Heart," by Dr. Helen Taussig, and published by the Harvard University Press for the Commonwealth Fund.

The stamps are distributed nationally by the Stamford Heart Association, 190 West Broad Street, Stamford, Connecticut, at a cost of $3.00 for each category (three stamps), postpaid.

The stamps imprint an outline of the heart and chest which enables physicians to record fluoroscopic findings of disease conditions or abnormal changes in the heart shadow. They are available in three categories. 1. *Infant:* small size 1½" x 1¼"; large size, 2" x 1¾". 2. *Child:* small size, 1½" x 1¼", large size, 2" x 1¾". *Adult:* one size only, 2" x 1¾". Three views are available in each size, anterior, posterior, left anterior oblique and right anterior oblique.

"STANDARDS FOR CONVALESCENT HOMES CARING FOR CARDIAC CHILDREN" AVAILABLE

As active rheumatic fever abates, the physician is often confronted with the problem of deciding whether a child will do better during the convalescent stage in his own home or in a convalescent institution. In this situation, the family doctor or pediatrician may find it helpful to consult a newly-issued manual of the American Heart Association, "Standards for General Convalescent Homes Caring for Cardiac Children." Based on a statement originally prepared by the New York Heart Association, the manual outlines and provides a checklist of the services, facilities and personnel convalescent homes require if they are to meet adequately the special needs of children with rheumatic fever or congenital heart defects. Copies of the manual are available from the Michigan Heart Association, 4421 Woodward Avenue, Detroit 1, Michigan.

SECOND WORLD CONGRESS ON CARDIOLOGY

A total of over 3,100 registrants from fifty nations attended the Second World Congress of Cardiology which was combined with the Twenty-Seventh Scientific Sessions of the American Heart Association in Washington, D. C., last fall. About one-third were physicians from abroad.

Paul D. White, M.D., Boston, who served as President of the Congress, was elected President of the International Society of Cardiology which sponsors these Congresses. He succeeded Charles Laubry, M.D., of Paris, who has held the post for the past four years, and who presided over the first international cardiology congress in Paris in 1950. Other officers named at a meeting of the

(Continued on Page 260)

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PR REPORT

SO SUCCESSFUL were the pilot meetings held with county medical society Public Relations committees and officers during the fall and winter to strengthen activities in the local community that similar meetings will become a continuing part of the MSMS over-all PR program. The plan was given full backing of The Council following a recommendation of the MSMS Public Relations Committee at its most recent meeting.

President Robert H. Baker, M.D., a guest at the meeting, told the committee how he had been impressed with the value of the county PR sessions after visiting several of them in various parts of the state. President-elect W. S. Jones, M.D., further endorsed the meeting schedule as an activity to be carried out during his term of office in 1955-56.

Readers will recall that MSMS instigated the meetings in larger counties, inaugurating the program last November. In workshop sessions, representatives of MSMS and its Public Relations Committee sat around the table with county society committeemen and leaders to evaluate current local PR activities and determine what projects might be added to improve or round out the efforts of the county society. The end result sought: Greater co-ordination, unity, and stability on the PR program of the medical profession throughout Michigan.

"WINNING FRIENDS FOR MEDICINE," the MSMS Public Relations "bible" introduced last year, will remain as the foundation and guide for the statewide program. This 26-point PR handbook was approved for use in the coming year, to lend continuity to the effort.

To further stimulate Medical PR in the months ahead, an MSMS Public Relations Committee member is to be appointed within each Councilor District to aid the Councilor in promoting the adoption of well-rounded PR programs in county societies, or keeping in high gear those already under way.

This latter plan was recommended by Secretary L. Fernald Foster, M.D., in his annual report to The Council.

PERIODIC HEALTH APPRAISAL program plans, a major project for the future, have been given an added boost with the authorization of a motion picture dealing with the subject. According to the plan, the movie will be used as an educational tool among MSMS members in the preliminary phase of the program, already in motion. With a few alterations the film will later be adapted for use in acquainting the public with the purpose of the Periodic Health Appraisal and what it entails.

Now in production is still another MSMS color motion picture. This one deals with epilepsy, which traditionally has been one of the "hush-hush" afflictions from the public viewpoint. Among several reasons for selecting epilepsy were this need for public understanding, the dearth of educational material, and the fact that current methods of management dramatically demonstrate the steady progress of Medicine.

RADIO IS NOT DEAD. Studies continue to indicate that, in spite of the great popularity of television, radio continues to command a large listening audience not only in the more remote non-TV areas, but in metropolitan communities as well. A recent survey by the MSMS PR Department indicates that Michigan is completely blanketed by the 50-odd medical shows broadcast weekly by local radio stations through co-operation of MSMS and county medical societies. Many of the programs are recorded shows fed to the stations by the Detroit PR office, although a few are produced locally.

Still popular and in weekly use is the "Tell Me, Doctor" series produced by MSMS several years ago. It is carried now by at least two Michigan stations, and has been placed recently with several stations in the South and West by a New York agency which pays royalties to MSMS for its use.

UPCOMING IN THE FIELD of Public Relations are two items worthy of immediate mention. First is a news code which can be used as a guide for press relations by county societies. The need

(Continued on Page 260)

You don't get cut-off images like this when you're radiographing with a Picker "Century" . . . because centering the x-ray tube to body part to Bucky is *uniquely positive and accurate.* Nor are you in for a back-of-table struggle when you want to shift from radiography to fluoroscopy . . . you swing the single tube under the table while you stand easily in *front* of it.

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AMA Washington Letter

THE MONTH IN WASHINGTON

A bill that is not a part of the official Eisenhower health program is causing a stir in Congress.

The bi-partisan measure would provide $90 million dollars to be spent over three years to help construct and equip non-federal medical research and laboratory facilities. Often in the past five years efforts have been made to get Congress to set up various huge new research programs pointed at one disease and calling for direct federal operation of the project. Without exception they have been turned down, Congress deciding that the existing National Institutes of Health are the proper vehicles for such all-federal research.

The bill that Congress now is interested in takes a different approach. It would have the federal government "get in and get out," a system used successfully in the Hill-Burton hospital construction program. Grants would go to nonprofit hospitals, medical schools, medical laboratories and like institutions, and the institution itself would have to match the federal money. Once the particular construction had been completed and equipped, the federal government would relinquish all control or influence over the project, as under Hill-Burton. Unlike the Hill-Burton plan, the grants would go directly from the U.S. to the project.

The Senate sponsors of this bill carry more than ordinary weight within their own parties. They are Senator Lister C. Hill (D., Ala.), who not only is chairman of the Labor and Public Welfare Committee, but also heads the subcommittee that passes on most health appropriations, and Senator Styles Bridges (R., N. H.). The latter has added prestige as chairman of the Senate Republican Policy Committee. The House sponsor is Rep. Percy Priest (D., Tenn.), chairman of the Interstate and Foreign Commerce Committee, which like Senator Hill's committee, is in charge of most health bills.

Introduction of specific bills to implement the President's own health program disclosed a few more details of what he wants from Congress, but generally the suggestions are the same as Mr. Eisenhower offered in his State of the Union Message, his Health Message and other earlier statements.

The reinsurance bill, again the center of controversy, is much the same as last year's bill, but singles out certain areas where the administration believes reinsurance would be particularly helpful. They are the coverage of rural families, greater protection for low-income families (including home and office calls), and the insurance of major medical costs. The new bill also makes some technical changes designed to assure that the federal government does not intend to regulate the insurance industry.

The bill for federal guarantee of private mortgages on health facilities follows the general lines of last year's Kaiser-Wolverton plan, but makes some concessions. For example, the new bill drops the requirement that a facility has to devote most of its services to prepayment plan patients.

As introduced, the Defense Department's bill for more medical care for military dependents had no surprises at all. It is exactly the same bill offered last year. Efforts had been made to write in some compromises, but these were given up for the time being. The major question, as it has been from the start, is whether most dependents are to get their medical care from an insurance plan such as is proposed for other U. S. employes and their dependents, or are to be cared for by uniformed physicians in military hospitals.

Other parts of the President's program, now up for action in Congress, propose more money for the medical care of public assistance recipients, grants to states for training practical nurses and for more advanced nurse training, and more research and training in mental health.

A surprise Eisenhower request is that this country lift its statutory restriction on the amount of money U. S. may contribute toward the World Health Organization. Under present law the U. S. may not pay more than $3 million annually. The administration wants this ceiling lifted to $5 million.

Congress currently is deciding how much money to allow for health programs for the next fiscal year, starting July 1. Although the administration requested for Mrs. Hobby's department only about what it is spending this year ($2 billion), the budget for Public Health Service was upped about $77 million. Most of the research institutes are scheduled for substantial increases.

A Michigan hospital reports that only 25 per cent of its income is from private pay patients; 75 per cent comes from insurance, Blue Cross and commercial, and about 5 per cent from other and government sources. The payroll this year will be 78 per cent of total cost.

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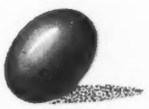

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Editorial Opinion

CHAOS BY DECISION

"Article 33. The board of trustees reserves the right to remove any member of the medical staff or to deprive any physician or surgeon of the privilege of the hospital whenever . . . the good of the hospital or of the patient therein demand it . . . (or) as in its judgment may seem for the best interest of the hospital and those who are to become patients therein."

This text, or the principle stated by this text, will be found in the regulations of every hospital competent to be entrusted with the care of people in this state. Rules like these evolved to protect people. In many instances they were developed locally by the people who were given the responsibility of supervising hospitals through election to the trusteeship of hospital boards; in many instances they were the result of trial-and-error experience or of specific research and experimentation. Whatever the source of the rules the end result has been the development of protective measures which have made our good hospitals the best in the world and a goal to which our poorer hospitals may aspire. The broad theory of protective care to the occupant of the hospital bed has no limitation to public or private or church supported hospitals.

The Supreme Court of the State of Michigan takes a different view. In the case of Samuel Albert et al., versus the Board of Trustees of the Gogebic County Public Hospital et al., Justice Reid, for the entire bench, indicates that "all lawful power to discipline any duly licensed physician and surgeon, or to suspend or revoke his right to practice in any public hospital . . . is exclusively committed to the State Board of Registration in Medicine—and Article 33 is accordingly void as an attempted usurpation of powers . . . set forth in the Medical Practice Act."

This is a prime example of the complete absence of any social consciousness or understanding of the social structure of the times. The great jurists of all time have made their pleadings for the needs of the people when there has been conflict with written statute: and this understanding nowhere is apparent in the present decision. An extension of this cold legalism beyond the realm of the public hospital involved in the case at hand to every hospital which offers its multiple and obvious blessings to the sick people of this state would bring chaos to people.

Since there is no appeal from this rigid decision, all of us must turn to our representatives in the legislative chambers to ensure the protective measures which our citizens have reason to expect and demand. People are entitled to this.—*Detroit Medical News,* February 7, 1955.

IN DEFENSE OF DOCTORS

"Doctor, I'm sick!"

Too often for the doctor's comfort these days the lament is directed not at the cause of the ailment but the cost of the cure. No less a personage than the eminent columnist, Dorothy Thompson, recently chided the medics for their alleged shortcomings. Among these, she said, was the practice of referring to surgery a patient who does not need it merely so the doctor and the surgeon can split a few dollars.

Representative Walter Judd, the able Minnesota lawmaker who is himself a doctor, said not long ago that the high cost of medical care might force socialized medicine.

Doctors are becoming alarmed. The thoughtful ones I know—and I know quite a few, all thoughtful—are racking their brains for an answer to their poor public relations.

They took the Hippocratic oath to do their best in the service of mankind and, by and large, they do it.

But honor bound to keep out of controversy and let their name be used only in inescapable situations like their own too-early obituary notices, the doctors are stuck.

Honor bound myself by nothing except the facts, I'd like to strike a blow for the doctors.

Two young men of equal talent graduate from college at twenty-two. One is an engineer and starts right out at a good salary. The second turns to medical schools (four years) and interning and specializing (four years).

By the time both are thirty, the engineer has already earned $40,000 to $60,000. The medical student has spent $2,000 a year to get more education. They reach the age of thirty some $60,000 to $75,000 apart.

If the medical man then begins to earn excellent money is that fair?

From personal observation I would have to give an unqualified and resounding yes.

No other practitioner of any art or science spends so much time in study as a fully qualified physician or surgeon. No other expends so much financially to achieve his goal. No other spends himself so freely.

We have just about given up trying to be sociable with the doctors we know. We tried to eat dinner at the pediatrician's house and I wound up making four house calls with him while the girls ate. They in turn tried to eat at our house and he was interrupted so often he finally just left.

We played bridge with a surgeon. He received

(Continued on Page 260)

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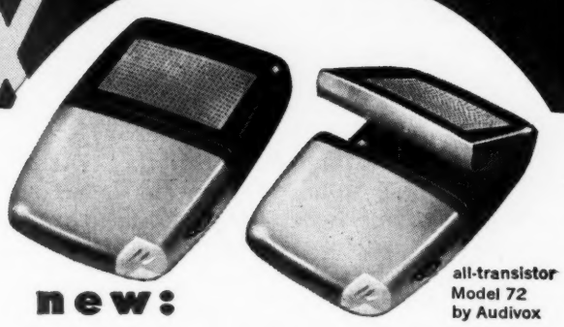

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IN DEFENSE OF DOCTORS

(Continued from Page 258)

only one call, but a doctor present had three calls and left about 10 p.m., returning at midnight.

Two lawyers, a surgeon and I sat down one night to plan some program for our church group. The phone rang. A child possibly had appendicitis. The lawyers and I went right ahead. The surgeon operated at ten that night.

Was the operation necessary?

I thought about Dorothy Thompson's attack at length. Last March my own doctor and surgeon agreed I should have some minor surgery. They had me in the hospital and almost on the operating table when the surgeon called to send me home; my wife was going to have a baby two weeks ahead of schedule.

Since then, the need for the operation has apparently vanished, at least for the time being.

Were these men trying to make money, or perform a service?

It is patently impossible that they were trying to make money from me, a newsman. They are both warm personal friends trying to do what they thought best for a friend. At the time, an operation seemed best.

Should the surgeon have taken out that child's appendix that night or not? If it were my child, I'd tell him to operate. I know he feels that 25 useless operations are better than one child dying of peritonitis because some surgeon held back.

Don't you?

The problems of the medical men are, I think, beyond the grasp of ninety-five per cent of the people. I have learned them only slightly in a lifetime of acquaintance with doctors, in a bitter past year spent mostly in their hands.

People cry loud and long over the "good old days" when one family doctor did it all from cradle to grave. Bitterly they assail the specialization and high cost of medical service.

Then they turn right around and call the TV repairman, the plumber, the electrician, the plasterer, the fuel oil man, the gas man, the roofing and gutter man. . . .

But why go on. The jack-of-all-trades is no more. Our machinery is too complex.

The bodily machinery is complex, too. It is the most complex mechanism in the world. To keep it running takes the best men with the most infinite patience and the longest training.

Have you called a plumber lately? Or a TV repairman?

Pretty big bill, wasn't it?

Should your doctor get less?

—Editorial by KINSLEY MCWHORTER, Jr., in *Roanoke (Va.) World-News,* December 31, 1954.

HEART BEATS

(Continued from Page 252)

Society's Council include: First Vice President, Prof. Ignacio Chavez, Mexico City; Second Vice President, Prof. D. E. Bedford, London; Secretary-General, Prof. Pierne Duchosal, Geneva; Treasurer, Louis N. Katz, M.D., Chicago; Assistant Secretary, John Palmer, M.D., Montreal.

Brussels, Belgium, was chosen as the scene for the Third World Congress of Cardiology to be held in 1958. The Inter-European Congress of Cardiology will be held in Stockholm in 1956, and the Inter-American Congress of Cardiology will convene in Havana in the same year.

PR REPORT

(Continued from Page 254)

for such a guide was expressed in several of the county society PR meetings mentioned above. Relations between county societies and news media have, in general, been excellent but informal. The code would primarily be useful in pinpointing responsibilities and privileges of both the medical profession and the press in dealing with local medical news.

Second is a study of methods of co-operation available to Medicine in a suggested program with the other professions to promote public understanding of the meaning of professional status.

The health of the people of the United States in 1954 was the best in its history, according to the Metropolitan Life Insurance Company. The reported death rate of 9.2 for each 1,000 population is a record low. Among the reasons were an absence of major outbreaks of respiratory illness and the reduction of mortality from tuberculosis by 20 per cent. Developments in medical science, the growth of public health activities, and an increase in the general standard of living were other favorable factors.

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The JOURNAL

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Foundation Stimulates Research in Arthritis

By James J. Lightbody, M.D.
Detroit, Michigan

THE MICHIGAN Chapter of the Arthritis and Rheumatism Foundation was founded in 1948 through the interest of H. T. Ewald of Campbell-Ewald Company, Dr. Hugo Freund, H. J. McLaurin of the Aetna Life Insurance Company and W. A. Moffett of Campbell-Ewald Company.

During the first two years, the Michigan Chapter devoted its entire efforts to the field of research in the rheumatic diseases, and this interest has been maintained and its activities enlarged during the past two years. During the six years of the chapter's existence, $376,511.12 has been allocated to thirty-two specific basic and clinical research projects in various hospitals and clinics throughout the state.

Research groups which have received assistance during the past five years include University of Michigan, Wayne University, Detroit Receiving Hospital, Children's Research Center, Ford Hospital, Providence Hospital, Wayne County General Hospital and Harper Hospital. Most of these research groups have maintained a continuous program of investigation into the causes of certain types of joint disease and have frequently investigated new methods of treatment. There have been forty-three scientific articles submitted and published by these various groups which have been assisted financially in their investigative program by the Michigan Chapter of the Arthritis Foundation. Although most of the research centers are located in Detroit and Ann Arbor, the benefits derived from the results of these investigations can well be appreciated throughout the state.

Dr. Lightbody is Medical Director, Michigan Chapter, Arthritis and Rheumatism Foundation; Chief, Arthritis Clinic at Harper and Detroit Receiving Hospitals.

Rehabilitation Program Continues

For the past two years there has been a great interest in the subject of rehabilitation in the field of arthritis, and the Michigan Chapter has assisted groups at Harper Hospital, Ford Hospital and the University of Michigan in treating selected cases of arthritis which have potential possibilities for some degree of rehabilitation.

The rehabilitation group at Harper Hospital, particularly, has maintained an arthritis consultation committee in which candidates for rehabilitation are screened to determine the possibilities for treatment. This committee is made up of several internists who are members of the American Rheumatism Association and the Michigan Rheumatism Society, an orthopedic surgeon, a physical therapist and a social service worker. Problem cases have been referred to this group from Detroit and from many other places throughout the state, and it is hoped that similar groups acting as consultants in difficult arthritic cases may be found in other parts of the state to give a more complete service to those individuals whose problems are far beyond the abilities of any one physician. Rehabilitation, which includes a rather full program of therapy for the patient, is a relatively new field of endeavor, and since the treatment of one single patient may involve weeks of hospitalization and many more weeks of frequent physical therapy treatments following the period of hospitalization, there is a great financial responsibility associated with these cases.

The Foundation does not in any way interfere with previously established physician-patient re-

lationships. During the past several years there has been a certain amount of cortone donated to the National Foundation, which was subsequently distributed to the local chapters to be used by them and donated to certain needy patients who are under continuous steroid therapy and who have no funds available to pay for these drugs. The supply of these materials has been very limited, but there have been a considerable number of patients who have been assisted towards rehabilitation because of the fact that they were able to obtain a certain amount of these hormones from the Foundation to maintain their schedule of treatment.

A part of any program of rehabilitation would necessarily include the use of the visiting nurse who may give treatments to the home-bound arthritic patient, with general nursing care including necessary injectable material, and also the frequent use of physical therapy applied by a registered physical therapist. The Michigan Chapter of the Arthritis Foundation has maintained a cooperative program with the Visiting Nurse Associations in the following cities in Michigan: Detroit, Bay City, Flint, Lansing, Pontiac, Grand Rapids, Marquette, Muskegon, Saginaw, Port Huron, Ypsilanti and Holland.

There has been considerable controversy among members of the Medical Advisory Committee of the Michigan Chapter relative to the value of home physical therapy unless the patient has a chance for some degree of rehabilitation. There is, and will be for some time to come, a severe shortage of physical therapists in Michigan; and several of the VNA groups in the state do not have access to any trained physical therapist to treat arthritics at home.

Up to the present time, the Michigan Chapter has offered home-bound arthritic patients general nursing care and/or physical therapy, but there is a general feeling among physiatrists and practicing physicians that physical therapy will do very little good unless applied frequently and also applied only to those who are making an effort to help themselves. In this program of home care, the Michigan Chapter pays only the deficit cost of home visits by the visiting nurse or physical therapist.

The Board of Directors of the Michigan Chapter recently approved a full-time physical therapist for the Grand Rapids Rehabilitation League. This therapist will treat arthritic patients who have been referred to the league for treatments by practicing physicians, and it is hoped that the therapist may take part in a home treatment program which will be developed by the rehabilitation league. Dr. Noyes Avery, Jr., of Grand Rapids has been very instrumental in pointing out the advantages of rehabilitation of the arthritic patient in Grand Rapids, and it is mainly through his interest and efforts that Grand Rapids was approved for the full-time physical therapist.

During the past year the Visiting Nurse Associations throughout the state have made over 10,000 visits to home-bound arthritic patients, and there were more than 1,500 physical therapy treatments given. There has been an increased cooperation on the part of the physicians directing the treatment of home-bound arthritic patients, and this is shown by the fact that they are giving more complete orders to the visiting nurse and to the physical therapist for treatment of these disabled patients. The physicians who are professionally responsible for these patients have been criticized in the past because of the lack of supervision of treatment of these home-bound arthritic patients. It is the duty of the visiting nurse and the physical therapist to attempt to educate not only the patient but also members of the patient's family in the type of exercises which are indicated in certain types of joint and muscle disability. The patient and members of his family can do a great deal for themselves if properly educated by the visiting nurse or physical therapist. Many of the regular visiting nurses have been taught the general principles and application of physical therapy by registered physical therapists so that they will in some way make up for the terrific shortage of physical therapists.

The Central Rheumatism Association will hold its annual meeting in Detroit on October 17, 1955. This association is made up of physicians from Michigan, Pennsylvania, Ohio, Indiana and Kentucky, who are particularly interested in the field of rheumatic diseases. This meeting will be an all-day session at which national authorities on the subject of arthritis will discuss important aspects of diagnosis and treatment and give reports on new research projects. The meeting will be held at Henry Ford Hospital, and all physicians in Michigan are cordially invited to attend.

This meeting of the Central Rheumatism Asso-

ciation is being sponsored by the Michigan Chapter of the Arthritis and Rheumatism Foundation and the Michigan Rheumatism Society. Dr. E. C. Vonder Heide of the Clinical Investigation Department of Parke, Davis & Company, as president of the Michigan Rheumatism Society, has appointed Dr. John Sigler of the Arthritis Clinic of Ford Hospital as general chairman for the Central Rheumatism Association meeting.

Films on Arthritis Available

There are two 16 mm. sound movies available for use by physicians and nursing groups on the general subject of arthritis.

The first film is entitled "Problems of Rheumatoid Arthritis," and has a running time of twenty-eight minutes. The film brings out some of the economic and social factors associated with arthritis and details common difficulties involved in the early diagnosis of rheumatoid arthritis, graphically describes the pathology of the disease, and then shows actual photographs of patients under treatment with the various common drugs used in therapy, including ACTH and cortisone. This film also brings out the importance of physical medicine in the modern treatment of arthritis and is of particular value for teaching purposes.

The second film has a running time of twenty-four minutes and is entitled "March of Medicine —Progress Report on Arthritis." This is a Kinescope film of a television program which was presented by the Arthritis and Rheumatism Foundation in co-operation with Smith, Kline and French, pharmaceutical company. This film has an all-star cast of national authorities on the subject of arthritis and rheumatism, including Dr. Walter Bauer of Boston, Dr. Charles H. Slocum of the Mayo Clinic, Dr. Joseph Bunim, Chief of the National Institute of Arthritis and Metabolic Diseases, and Dr. Edward W. Lowman of the Institute of Physical Medicine and Rehabilitation.

Both of the above films are available at no charge to hospital staffs and nursing groups, and anyone wishing to use these films may apply for specific dates from the office of the Michigan Chapter, Arthritis and Rheumatism Foundation, 205 Basso Building, 7338 Woodward Avenue, Detroit 2, Michigan.

If there is no 16 mm. sound projector for the showing of these films in your community, the Arthritis Foundation will complete arrangements to make a projector available.

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Foundation President's Report

By H. J. McLaurin

Detroit, Michigan

DURING the six years of its existence, the Michigan Chapter of the Arthritis and Rheumatism Foundation has fairly well consolidated its program of work and service in the State of Michigan. We think we have achieved the pattern for doing the most good—both long range and short range—with the money we receive.

While this seems a very simple matter, it has been anything but simple. How far should we go in research—the primary field of a health agency—how far should we go in direct service to patients in as many communities as possible—how much should be spent in education of arthritic persons and their families to provide home care—how much should we spend in pamphlets, motion pictures, talks at luncheon clubs and before nursing and medical associations? Certainly, the answers to these questions have not been simple.

I have been in a sufficient number of money-raising campaigns to know that money does not come easily—and consequently not only I, but our Chapter's Board of Directors, guard zealously the money entrusted to us each year.

Probably a thumb-nail picture of our activities can be given by indicating the percentage of our money that went to our four divisions of expenditure during the fiscal year ending April 30, 1954: 47 per cent went for grants-in-aid for research; 20 per cent went for direct aid in our home service program; 21 per cent went to our National Foundation; and 12 per cent went for medical and general administrative expenses. I might also say that our last year was one of expansion in several departments so that we actually spent more than we received. The difference was made up by a surplus we had on hand.

Since we think our activities have stabilized, to a great extent, we are now working on interesting more prominent people in our work; increasing and strengthening our Board of Directors; attempting to do a better public relations job in explaining what we are doing and why we are doing it as we do; doing a more extensive job providing talks over the radio and television and before luncheon clubs, and in showing motion pictures before nursing groups and at state and regional medical gatherings; providing exhibits wherever possible.

These activities are "intangibles" because we have had to do first things first—but "intangibles" often turn out to be extremely important—to us, to the Michigan United Fund (U. H. & W. F. of Mich.) and the United Foundation of Detroit which supply our funds.

To illustrate, we gave a luncheon early last year to General Kenney, President of the National Foundation, to which were invited a number of prominent Detroiters, including Mr. Keller, Chairman of the Board of Chrysler Corporation. On this occasion, we invited a number of prominent businessmen in Detroit to hear General Kenney's message.

At our recent annual meeting, we increased our Board of Directors from ten to fourteen, electing as new members, C. C. Smythe, Vice President of the Wabeek State Bank of Detroit; Frank J. Brady, President, Frank J. Brady Co., Detroit; Harry W. Betteridge, President, Betteridge & Co., Detroit, and Maurice J. Mayer, Community Relations Counsel, Michigan Chain Stores Association, Lansing. Mr. Smythe was also elected to the post of treasurer of the chapter.

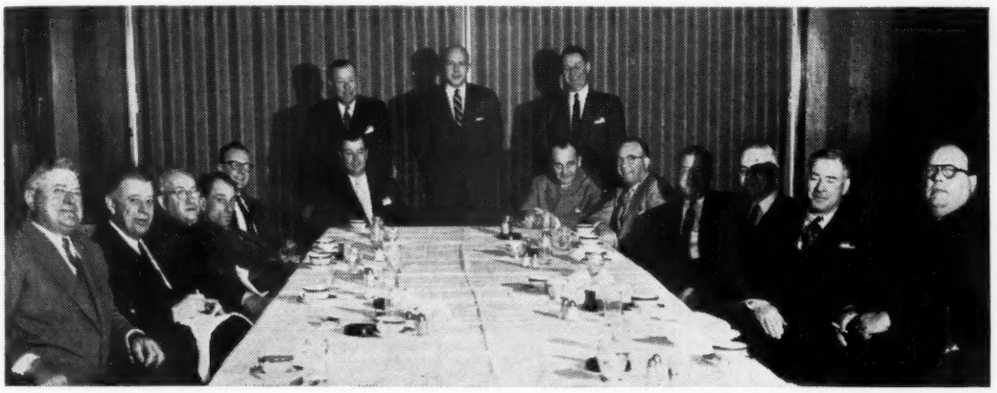
The Michigan Chapter was also instrumental in obtaining from the U. S. Public Health Service an increase in its appropriation from $7,000,000 to $8,000,000 for research in metabolic diseases. Our own Senator Ferguson of Michigan is a member of this Senate committee.

Our National Foundation, as well as the Michigan Chapter, was represented at the budget hearings. It might be of interest to note here that the Arthritis and Rheumatism Foundation has been able to get this appropriation increased threefold in the last five years.

The Michigan Chapter believes it has taken very important steps forward in the hiring of a physical therapist. Miss Eleanor Parmelee is supervising our service to all confined arthritic persons through the Visiting Nurses Association of Detroit and in ten other cities as follows: Grand Rapids, Pontiac, Flint, Bay City, Lansing, Muskegon, Port Huron, Saginaw, Marquette and Ypsilanti. This work is carried on through the Visiting Nurses Association in the above cities.

Mr. McLaurin is President of the Michigan Chapter, Arthritis and Rheumatism Foundation.

Therapy, as applied to arthritic persons, begins where other therapy stops. Visiting nurses are taught basic therapy first. It is at this point that Miss Parmelee teaches the application of therapy to arthritic patients. Families of confined arthritic persons, wherever possible, are taught the mechanics of this type of therapy so that they may take over as soon as possible. During the past year, the Michigan Chapter, throughout the entire state, provided approximately 14,000 of these treatments. This is six times as many treatments as was provided by any other of the thirty-six chapters of the Arthritis and Rheumatism Foundation.



Luncheon given to General George C. Kenney, president of Arthritis and Rheumatism Foundation by President H. J. McLaurin of the Michigan Chapter in the Detroit Athletic Club in March, 1954, to introduce him to many Detroiters interested in arthritis work. General Kenney, at a dinner meeting later in the day at the Club, addressed the Board of Directors and Medical Advisory Committee members of the Michigan Chapter.

Seated (l. to r.) K. T. Keller, chairman of the Board, Chrysler Corporation; General Kenney; W. A. Moffett, V.P., Campbell-Ewald Co.; William Lutz, *Detroit News* reporter; Robert Hunter, National Automotive Fibres; Lyman Lewis; Dr. E. C. Vonder Heide; Robert Nulty; Dr. J. J. Lightbody; David Mitchelson, treasurer, Parke, Davis and Co.; James Beresford, Booth Newspapers; Sterling Eaton, publisher, *Plymouth Mail. Standing (l. to r.)* Mr. McLaurin, Richard Booth, campaign manager, Detroit United Foundation, and Louis Trombla.

However, we have run into a difficult problem in our treatments to home-bound arthritic patients. Since we have but approximately $40,000 to spend on this work annually and the calls for this service have been increasing so rapidly, the Board of Directors at the last annual meeting decided that in the future we limit our treatments to those arthritic persons who have possibilities of being rehabilitated.

While we disliked making such a decision—because other arthritic persons are in need of nursing type of treatments—we have to hold the line because of our financial limitations. After all, we are a health organization, and research must continue to be the cornerstone of our efforts.

As I have already stated, we are stepping up the educational end of our work—through more talks before medical, nursing and lay groups—through a greater showing of our motion pictures. Again this year an entire issue of THE JOURNAL of the Michigan State Medical Society is being devoted to articles on arthritis—which extends the use of our research findings through the medical profession—and to the State Medical Society we extend our sincere appreciation for this great help.

Michigan could well be called the birthplace of the Arthritis and Rheumatism Foundation because of the activity in this work prior to its being put on a national scale. In recognition of this, the National Arthritis and Rheumatism Foundation has designated the Michigan Chapter as the Number 1 chapter of the United States. It is worthy of note that the Michigan Chapter provided more direct service to arthritic persons and more research into the cause and cures than any other chapter in the United States.

To the Michigan United Fund (U.H. & W.F. of Mich.), we extend grateful thanks for the money they grant to us yearly—and this goes, too, for the United Foundation of Detroit. The officers of the Michigan United Fund (U.H. & W.F. of Mich.) and the budget committee of this organization have both been most considerate, understanding and gracious in all our dealings with them.

To my fellow officers, and my colleagues on both the Board of Directors and the Medical Advisory Committee, I extend sincere thanks for their conscientious and willing help in all the chapter's undertakings.

Joint Fluid Changes in Rheumatoid Arthritis

By William D. Robinson, M.D., Ivan F. Duff, M.D., and Elizabeth M. Smith, A.B.
Ann Arbor, Michigan

PROFOUND alterations appear in both the cytologic and physical characteristics of the joint fluid in rheumatoid arthritis. In the first patient in whom we had the opportunity to observe the response of rheumatoid arthritis to ACTH or cortisone in September, 1949, rapid but temporary reversal of the joint fluid findings toward normal was noted. Such observations suggested a means of evaluating the effect of adrenocortical steroids injected directly into the joint cavity. The possibility that these steroids exerted their effects locally on connective tissue was first suggested to us by the work of Baker and Whitaker,[1] and studies on the effect of intra-articular injection of cortisone were initiated in March, 1950. When hydrocortisone became available, it was immediately evident that its local action was much more potent than that of cortisone. Not only were the changes produced in the joint fluid more consistent and of greater magnitude, but subjective and objective clinical improvement of several days duration was frequently produced. The studies here reported were carried out with the dual objectives of (1) elucidation of the mode of action of the adrenocortical steroids in rheumatoid arthritis, and (2) determination of the clinical usefulness of repeated intra-articular injections of hydrocortisone in the practical management of this disease.

Characteristics of Synovial Fluid

The most extensive study of synovial fluid, both from normal subjects and from patients with various types of joint disease, is that of Ropes and Bauer, recently reported in monograph form.[19] Studies on normal synovial fluid in man are based upon material obtained from the knee joint (often at the autopsy table) which, in a normal adult, seldom is in excess of 0.5 to 3 cubic centimeters. It characteristically is clear, pale yellow in color, and is free of visible particles; it is very viscous but does not clot. In contrast, in the exudative reaction which dominates joint pathology in rheumatoid arthritis the quantity of joint fluid is increased and it is often watery thin. Its color may vary through graduations of yellow to amber; it frequently is cloudy, opaque or turbid and often contains visible fibrin debris, or fibrin bodies; it often clots rapidly on standing.

There are relatively few cells in normal joint fluid; Ropes and Bauer reported an average of 63 nucleated cells per ml., with a range from 13 to 180. Most of the cells are mononuclear; polymorphonuclear cells averaged only 6.5 per cent in normal fluids, ranging from 0 to 25 per cent. In fluids from patients with rheumatoid arthritis, the total leukocyte count is increased, nearly always due to a great increase in polymorphonuclear cells. In 146 such fluids, Ropes and Bauer found the total leukocyte count to range from 450 to 66,000 per ml., with an average of 15,310; the average proportion of polymorphonuclear cells was 65 per cent, with a range from 0 to 96 per cent. In the present study, we have found the total white cell count in thirty-five untreated joints with active rheumatoid arthritis to range from 4,800 to 63,550 per ml., with an average of 21,730. Of these, polymorphonuclear cells have accounted for an average of 85 per cent, ranging from 29 to 91 per cent.

All available evidence supports the concept that joint fluid is a simple dialysate of blood plasma.[19] It differs from other plasma dialysates by virtue of containing an easily dissociable protein-polysaccharide complex known as mucin. This characteristic component accounts for the distinguishing properties of synovial fluid, and is presumably formed by the connective tissue surrounding the joint. Mucin is believed to be present in the synovialis and subsynovial tissue and is generally considered to be one of the constituents of the ground substance of connective tissue. The possible extent to which joint fluid mucin represents a conveniently accessible sample of connective tissue mucin is unknown.

The exact composition of mucin has not been determined. Little is known with respect to its protein components or the way in which the pro-

From the Rackham Arthritis Research Unit, University of Michigan, Ann Arbor. The Rackham Arthritis Research Unit is supported by a grant from the Horace H. Rackham School of Graduate Studies. The expenses of this study were defrayed in part by grants from the Michigan Chapter, Arthritis and Rheumatism Foundation, and from the United States Public Health Service, through the National Institute of Arthritis and Metabolic Diseases (A-24)

tein is bound to the polysaccharide. The polysaccharide component, however, has been identified as hyaluronic acid, a non-ramified polymer of D-glucuronic acid and N-acetyl-D-glucosamine in a tough fibrous grayish-yellow ropey clump which does not fragment on shaking, adheres firmly to a stirring rod and leaves a clear surrounding medium.[19]

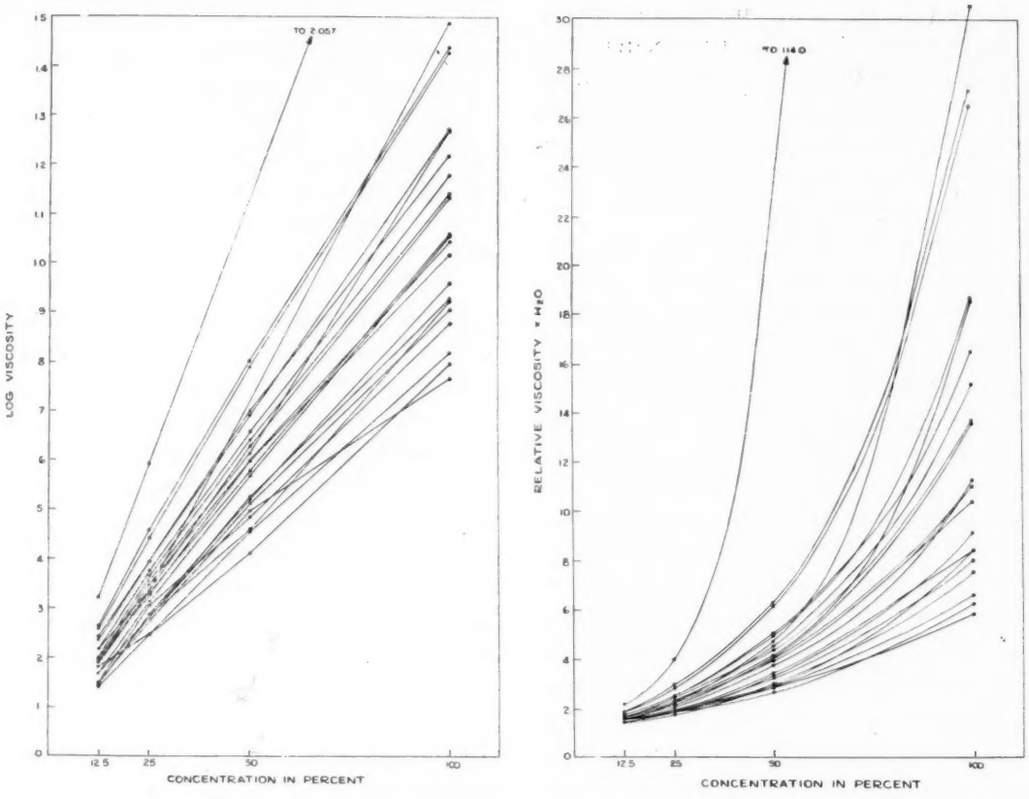


Fig. 1. The relative viscosity of twenty-one synovial fluids, noting changes produced by serial dilution with normal saline. Note that relationship of concentration to relative viscosity (right) is not linear. However, plotting the concentration against the logarithm of viscosity (left) results in a straight line. Similar curves are obtained with solutions of purified polysaccharide. It is evident that $\frac{\text{log. viscosity}}{\text{polysaccharide concentration}}$ will be constant for each fluid at any concentration.

equimolar amounts, connected through beta-glucosidic 1-3 linkages.[11,16] There is evidence that the long chain molecule of the polysaccharide component, hyaluronic acid, is responsible for certain physical properties of synovial fluid such as its viscosity.[18]

The viscosity of joint fluid is of especial interest and importance. It usually has been measured as relative viscosity in relation to the viscosity of water. In twenty-two normal fluids, Ropes and Bauer[19] found the relative viscosity at 38 degrees C. to average 235, with a range from 5.7 to 1160; in thirteen normal fluids, Ragan and Meyers[18] reported values ranging from 3 to 575. Another characteristic of synovial fluid dependent on mucin is the type of clot formed upon addition of dilute acetic acid. In normal fluids, this mucin clot is

Investigation of these properties in the synovial fluid of patients with rheumatoid arthritis indicates a significant alteration in the characteristics of the protein-polysaccharide complex in this disease. The mucin precipitated by addition of dilute acetic acid frequently takes the form of a soft friable mass in a cloudy solution or merely shreds of a flocculent precipitate. In our experience with this test in forty-nine fluids from patients with rheumatoid arthritis, the mucin clot formed was classified as good to excellent in twenty-seven (55 per cent), as fair to poor in eighteen (37 per cent), and no clot was produced in four (8 per cent). A distinct reduction in relative viscosity is also a feature of the joint exudate in rheumatoid arthritis; values approaching those of water are not uncommon. Ropes and Bauer[19] found an aver-

age viscosity at 38 degrees C. of 11, with values ranging from 2.7 to 59, in sixty-nine rheumatoid fluids; Ragan and Meyers[18] found the relative viscosity to be below 50 in thirty-seven of forty-one rheumatoid fluids tested. In our present study, the relative viscosity of thirty-five fluids at 20 degrees C. ranged from 5 to 48, with a median value of 10.6. Such a reduction in viscosity might be due to either a reduction in the concentration of hyaluronic acid in the joint fluid, or due to a decrease in the degree of polymerization of the hyaluronic acid. Ragan and Meyers[18] undertook to determine which of these changes was primarily responsible for the reduction of viscosity in rheumatoid arthritis. By serial dilutions of joint fluid and of isolated polysaccharides, they demonstrated a linear relationship between the concentration of polysaccharide and the logarithm of the viscosity obtained, a finding which we have confirmed (Fig. 1). Using a turbidometric method of determination, they found that the concentration of hyaluronic acid was not greatly altered in rheumatoid joint fluids as compared to normal fluids. The ratio of the logarithm of the viscosity divided by the concentration of polysaccharide was used as an index of the degree of polymerization of the hyaluronic acid; in forty-one fluids from patients with rheumatoid arthritis, this ratio was consistently lower than in thirteen normal fluids. They concluded that the joint fluid in rheumatoid arthritis contained an approximately normal concentration of poorly polymerized hyaluronic acid; since the volume of synovial fluid is greatly increased in this disease, the total amount of hyaluronic acid present is far in excess of that found in the normal joint.

Materials and Methods

The patients presented the characteristic features of rheumatoid arthritis—chronic, usually symmetrical, joint involvement with thickening of synovial tissues and synovial effusions, systemic manifestations of fatigability and weight loss, an elevated sedimentation rate and typical x-ray findings. Most of these patients have been under observation for months or years prior to and following the studies reported here. All patients were classified as to stage of disease progression and functional capacity according to the criteria adopted by the American Rheumatism Association (ARA).[20] In addition, we have attempted to grade the activity of the disease process arbitrarily as follows:

Grade III. Synovitis, with or without effusion, with definite increased heat, tender to touch and painful on motion (non-weight bearing); accompanied by fever or recent weight loss.

Grade II. Definite active synovitis, with or without effusion, with little or no increase in heat, tenderness or pain; no severe constitutional reaction.

Grade I. Low grade chronic synovitis, with or without effusion, lacking increased warmth and tenderness and with pain only at extremes of range of motion or upon weight bearing; no significant constitutional reaction.

Aseptic technique using rubber gloves was carefully followed in all aspirations from and injections into the joints. Careful preparation of the skin included shaving if necessary, preliminary scrubbing with phisoderm, followed by the application of tincture of iodine then washed away with 50 per cent propanol. Wrapping of the joint with an elastic bandage above and below the site of paracentesis was found to facilitate removal of fluid. Aspirations and intra-articular injections were preceded by procaine infiltration. Most of the fluids examined were obtained from the knees; the medial or lateral approach was used in aspirating. In most instances as much synovial fluid as could be conveniently obtained was removed prior to instillation of the steroid under investigation. Upon withdrawal of the needle, the site of puncture was covered with a sterile pledget of cotton covered with collodion.

Hormones employed included ACTH, cortisone acetate, a free alcohol preparation of cortisone, hydrocortisone acetate and a free alcohol preparation of hydrocortisone.* In two patients, control studies, utilizing isotonic solution of sodium chloride, were made in similarly anesthesized contralateral joints.

A minimum of 4 to 5 cc. of joint fluid are required to complete the examination as performed by us. If the Hess viscosemeter, or similar instrument, is available, a complete examination can be made upon smaller quantities of fluid. At the time of withdrawal the gross appearance of the fluid as to color, presence or absence of clots and probable degree of viscosity was noted; the total

*The ACTH used in this study was supplied to us by the Armour Laboratories, Chicago, Illinois. Generous supplies of the steroids investigated were made available to us by Merck and Co., Rahway, New Jersey, and the Upjohn Co., Kalamazoo, Michigan.

quantity obtained was measured. Cytological examinations were made without delay upon fluid which had been placed in containers with a small quantity of sodium oxalate to prevent clotting. Both red and white cell counts were made, using the same technique as for blood counts except that normal saline was used as diluting fluid; the usual diluents will cause precipitation of mucin in the pipettes and counting chambers. Films stained with Wright's stain were utilized for differential cell counts. No attempt was made, in counting the mononuclear cells, to differentiate between lymphocytes, monocytes, clasmatocytes and synovial cells. The remainder of the fluid was placed in containers with small amounts of sodium oxalate. The clear supernatant fluid obtained by centrifugation was utilized in all subsequent tests which included the formation of a mucin clot upon addition of acetic acid, determination of the relative viscosity (Ostwald viscosity pipette in constant temperature bath at 20 degrees C.) and of the polysaccharide concentration. It has been our practice to make these determinations the same day that the fluid was obtained. Re-centrifugation is desirable if studies are made on stored specimens.

The mucin clot test was carried out by the method of Ropes and Bauer,[19] with the addition of stirring 0.13 cc. of 7 N acetic acid into the joint fluid. An attempt was made to render this test semi-quantitative by testing serial dilutions of joint fluid with water from 1:5 through 1:40, but such dilutions yielded no additional information. The results reported in this paper were those obtained in the 1:5 dilution, graded as follows:

Excellent	(++++)	—large clot, clear background.
Good	(+++)	—smaller clot, clear background.
Fair	(++)	—small clot, cloudy background.
Poor	(+)	—any clot, flocculent precipitate.
Negative	(0)	—no clot on stirring rod.

The polysaccharide concentration was determined by the turbidometric method used by Ragan and Meyers,[17,18] with the following modifications: (1) formation of mucin clot was avoided, when necessary, by using a suitable dilution of joint fluid with citrate-phosphate buffer, rather than by using hyaluronidase; (2) horse serum albumin was used to develop turbidity, rather than horse serum; (3) the standard used was chondroitinsulfate, rather than hyaluronic acid; this was necessary because of our inability to obtain a purified preparation of hyaluronic acid with reproducible turbidogenic properties. Because we have used a different standard, our values for polysaccharide concentration, and indices calculated from these values, cannot be compared with those of other workers; however, the same standard was used throughout our study, so that the relative values are consistent throughout.

While the ratio of

$$\frac{\text{log. viscosity}}{\text{polysaccharide concentration}}$$

provides a first approximation of the degree of polymerization of the hyaluronic acid in synovial fluid, a really accurate polymerization index must await the development of more specific methods of determining the values which enter both the numerator and the denominator of the ratio. Current methods of determining viscosity are open to criticism, primarily because the rheologic characteristics of synovial fluid are those of a non-Newtonian fluid.[3] Both chemical and turbidometric methods of determining polysaccharide concentration are open to question on grounds of specificity and accuracy. For these reasons, quotation marks are used when the ratio

$$\frac{\text{log. viscosity}}{\text{polysaccharide concentration}}$$

is referred to as "polymerization index." In this report, this index is used primarily to indicate that observed changes in viscosity following hormone administration cannot be explained solely on the basis of change in polysaccharide concentration.

Correlation of Activity of the Rheumatoid Process with Joint Fluid Abnormalities

Upon the basis of extensive study of patients with rheumatoid arthritis, Ropes and Bauer[19] reported that, in general, variations in synovial fluid can be correlated grossly with clinical or laboratory evidence of the severity of the disease as a whole, with the degree of inflammation in the aspirated joint or the duration of the disease or the effusion. Usually, the fluids showing the least variation from normal were from early mild cases, although occasionally only slight abnormalities were found in effusions of many years duration. In the individual patient it was often difficult to correlate cytological findings with the sever-

TABLE I. COMPARISON OF CHARACTERISTICS OF SYNOVIAL FLUID REMOVED SIMULTANEOUSLY FROM TWO JOINTS IN UNTREATED ACTIVE RHEUMATOID ARTHRITIS

Patient	Joint Aspirated	Duration of Involvement	Activity Grade	Sed. Rate (Westergren) mm./hr.	Total WBC Count per ml.	Absolute PMN Count per ml.	Mucin Clot (1:5)	Relative Viscosity	Polysaccharide as Chondroitin-Sulphate mg./ml.	Log Viscosity / Polysacch. Conc.
D. K.	Rt. Knee	4 yrs.	II	24	8,300	830	+++	40.0	1.47	1.10
	Lt. Knee	4 yrs.	II		9,800	4,018	++	5.6	0.74	1.01
W. S.	Rt. Knee	8 yrs.	II	25	11,500	9,315	+++	8.9	0.80	1.19
	Lt. Knee	8 yrs.	II		10,500	8,715	++++	14.8	1.01	1.16
A. R.	Rt. Elbow	5 yrs.	II	27	53,000	48,321	+++	20.4	1.24	1.06
	Lt. Elbow	5 yrs.	II		51,700	44,462	++++	QNS	QNS	QNS
G. G.	Rt. Knee	6 yrs.	II	57	15,700	14,915	+	4.7	0.67	1.00
	Lt. Knee	6 yrs.	II		17,000	15,300	+++	7.8	0.85	1.05
A. C.	Rt. Knee	15 mos.	II	6	15,590	14,373	+++	5.4	0.64	1.15
	Lt. Knee	17 mos.	II		5,650	4,972	+++	6.0	0.64	1.21
C. T.	Rt. Knee	4 yrs.	III	*2.05	26,450	23,300	+	9.4	1.07	0.91
	Lt. Knee	4 yrs.	III		2,700	2,320	+	8.3	1.12	0.82
F. T.	Rt. Ankle	2 wks.	III	13	7,800	2,100	++++	37.6	1.23	1.29
	Rt. Wrist	2 wks.	III		6,550	4,524	++++	40.8	1.34	1.20
G. M.	Rt. Knee	9 yrs.	III	50	19,650	15,700	++	4.9	0.57	1.21
	Lt. Knee	10 yrs.	III		4,800	1,180	++++	20.0	0.94	1.39
F. K.	Rt. Knee	1 yr.	III	63	15,150	13,900	++	3.7	0.59	0.96
	Lt. Knee	1 yr.	III		12,800	7,950	0	3.6	0.66	0.83
F. J.	Rt. Knee	5-6 yrs.	III	84	40,550	30,818	++	11.6	1.04	1.02
	Lt. Knee	5-6 yrs.	III		21,150	11,421	++	16.4	1.00	1.21
J. H.	Rt. Knee	2 yrs.	III	*2.20	11,450	9,500	+	QNS	QNS	QNS
	Lt. Knee	2 yrs.	III		15,000	12,725	+++	5.6	QNS	QNS
B. G.	Rt. Knee	5 yrs.	III	29	26,500	22,500	++	QNS	QNS	QNS
	Lt. Knee	1 yr.	III		24,000	19,450	0	2.9	0.29	1.59
L. G.	Rt. Knee	3 yrs.	III	*1.80	9,450	7,844	++++	QNS	QNS	QNS
	Lt. Knee	3 yrs.	III		17,900	14,687	+++	QNS	QNS	QNS
E. G.	Lt. Knee	7 mos.	III	44	9,200	8,000	0	4.6	QNS	QNS
	Lt. Shoulder	7 mos.	III		19,950	18,200	+	4.8	QNS	QNS
K. E.	Rt. Knee	20 yrs.	IV	77	20,000	16,600	QNS	QNS	QNS	QNS
	Lt. Knee	2 yrs.	III		26,550	24,600	++	5.3	0.67	1.08
E. C.	Rt. Knee	10 yrs.	III	124	19,850	16,300	+++	10.6	0.74	1.37
	Lt. Knee	10 yrs.	IV		2,750	1,760	+++	8.6	0.62	1.49
A. B.	Rt. Knee	10 mos.	III	32	21,700	20,398	+++	6.5	0.85	0.95
	Lt. Knee	10 mos.	III		15,950	14,472	+++	6.5	0.85	0.95

*Rourke-Ernstein method, in m./min.

ity of the disease process in the joint. However, a low fluid glucose level, low viscosity, poor mucin precipitate and an electrophoretic distribution of fluid proteins similar to that in serum suggested severe rheumatoid arthritis. Our findings are in general agreement with these observations, although we have been unable in many instances to clearly correlate degree of severity of joint disease to changes in the synovial fluid. There was some correlation apparent between activity of the synovitis and the total cell count. Thus, of twenty-four specimens from joints classed as Grade II in activity, only six had a cell count in excess of 25,000; by contrast, in twenty-nine specimens from Grade III joints, fourteen had a cell count in excess of 25,000. There was no apparent correlation between the grade of activity and the viscosity and quality of mucin-clot formation. No correlation was usually apparent between the total cell count and viscosity of the specimen. In general, it appeared that if excellent mucin-clot formation was present, the absolute polymorphonuclear cell count tended to be under 10,000 (nine out of twelve specimens); there was no apparent correlation between the level of the cell count and less satisfactory mucin-clot formation. There appeared to be some correlation between the viscosity value of a joint fluid and the quality of mucin-clot formation. This is apparent in the scatter diagram (Fig. 2): of eight specimens with excellent mucin-clot formation, seven had a viscosity value of 20 or above, while four were over 30 units. Of sixteen specimens with good mucin-clot formation, ten had viscosity values of 10 or less while only three were over 20 units. Of eight specimens with fair mucin-clot formation, five had viscosity values over 5 units, only one had a value of 15 units. There was similar correlation between poor or negative mucin-clot formation and viscosity values: of nine such specimens, only three had viscosity values in excess of 5 units.

Synovial fluid specimens removed simultaneously from similarly affected but different joints often demonstrate strikingly parallel cytological and physical characteristics. These similarities in seventeen pairs of joints are apparent in Table I, from which it will also be seen that in individual cases close correlation may not be apparent between joint fluid characteristics and the clinical evaluation of severity of the disease process.

Joint Fluid Changes Following Systemic Administration of ACTH and Adrenocortical Steroids

The systemic administration of these hormones in large doses may be accompanied by visible reduction in the gross quantity of fluid contained in the inflamed rheumatoid joint. It may, indeed, become impossible upon repeated aspiration to obtain enough fluid for examination. The gross appearance of the fluid is often markedly altered; fibrin debris and clots, prominent in the control specimen, may disappear; the color may revert to normal. The viscosity of the specimen may have obviously increased, as evidenced by its increased stickiness and tendency to thread formation upon separation of the needle from the aspirating syringe. The magnitude and direction of the cytological changes seen with the short-term systemic administration of comparatively large doses of ACTH, hydrocortisone and cortisone are essentially the same with each agent. Striking reduction to normal or near normal may occur in the total number of cells and particularly in the proportion of polymorphonuclear cells. In general, the total number of mononuclear cells is not significantly or consistently altered. There is an associated improvement in quality of the protein-polysaccharide complex; the viscosity increases and the type of mucin clot improves. The actual concentration of the polysaccharide is not impressively altered; this results in an increase in the ratio of the $\frac{\text{log. viscosity}}{\text{polysaccharide concentration}}$

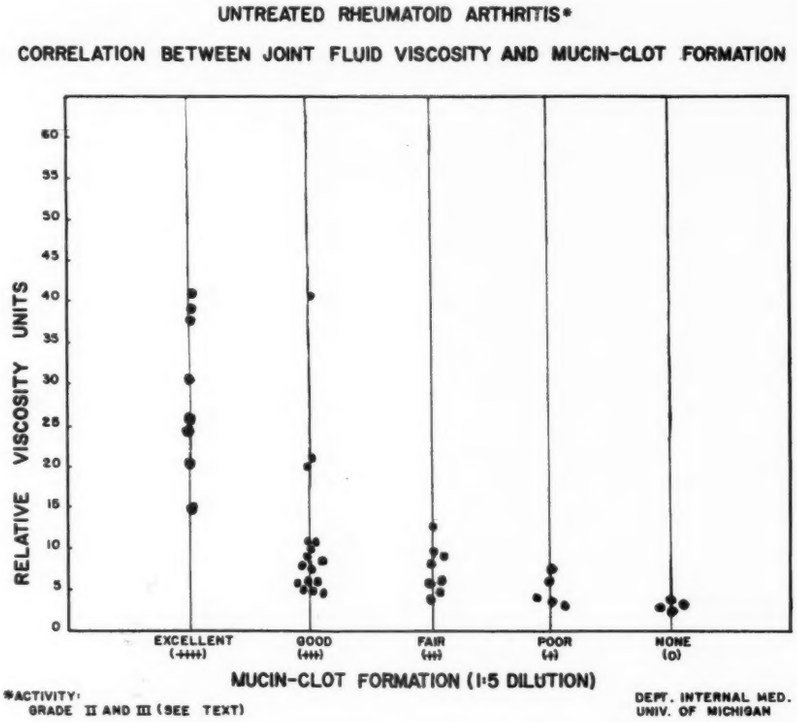


Fig. 2. Correlation between relative viscosity and mucin clot formation on addition of dilute acetic acid in synovial fluid from patients with rheumatoid arthritis prior to treatment.

Case 1. (Fig. 3).—L.G., a fifty-five-year-old man described the onset in 1947 of finger and shoulder pain. Because of progression into multiple joints, he was placed on gold salts which, within a short period, had to be discontinued because of stomatitis and dermatitis. Despite the employment of all known methods of treatment, his subsequent course was unfavorable and he became markedly incapacitated. He was admitted to the University Hospital on September 25, 1949, for a metabolic study with ACTH. At that time he was taking 8 to 10 aspirin tablets daily; crutches were required for stairs; at other times he used a wheelchair. Early morning and late afternoon stiffness was prominent. The fingers, wrists, elbows, shoulders, knees, and ankles were involved by an active synovitis characterized by swelling, tenderness, thickening of joint capsules and excessive effusions of joint fluid. The sedimentation rate (Rourke-Ernstein) was elevated to 1.5 mm./minute. X-ray examination demonstrated generalized osteoporosis with reduction of joint space and cystic de-

struction of subchondral bone. The fluid aspirated from the knees on September 30 contained numerous fibrin clots; the total cell count was 6,250, of which 4,875 were polymorphonuclear and 1,375 were mononuclear

Correlation of his clinical course with the sedimentation rate and joint fluid cytology is evident in Figure 3. At the height of his clinical response, on the fourth day of ACTH (October 7) the total cell count of the

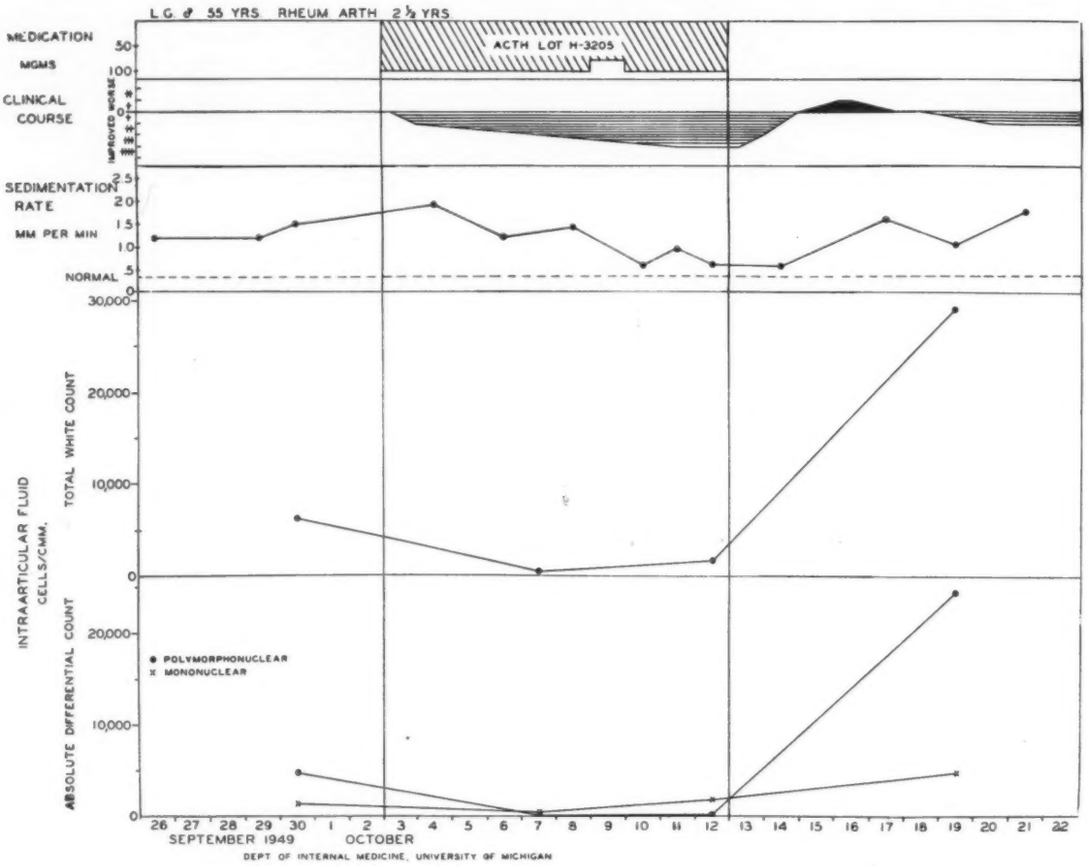


Fig. 3. Case 1, patient L. G. Changes in cytologic findings in synovial fluid during intramuscular administration of 100 mg. daily of ACTH to a patient with active rheumatoid arthritis, Stage III, Class IV; correlation with general clinical effect and sedimentation rate (Rourke-Ernstene).

cells. On the basis of the criteria of the ARA, progression was graded as Stage III and function as Class IV.

After one week in the hospital and five days of placebo medications, during which time his symptomatology did not particularly change, the patient received 100 mg. per day (25 mg. every six hours) of aqueous ACTH intramuscularly for a period of ten days. This was associated with dramatic improvement of appetite, lessening of fatigue, disappearance of stiffness and improved ability to move about. There was progressive decrease in joint fluid accumulation in the knees, which was believed to have become normal in amount on the eighth day of treatment. On October 13, 1949, placeboes were substituted for ACTH; within eight hours there began a dramatic relapse in all joints. Fluid reappeared in the right knee within four days, although it could not be obtained for examination until October 19.

fluid aspirated from the knee was only 375, of which 19 were polymorphonuclear cells while 356 were mononuclear cells; substantially the same findings were obtained upon aspiration on the ninth day of the study. The gross appearance of the joint fluid was not altered. Ten days after the last dose of ACTH, relapse in joint fluid cytology was well correlated with clinical relapse, since the total cell count had increased to 29,400 primarily due to an increase in inflammatory polymorphonuclear cells.

Within a period of four weeks the clinical status of the patient had reverted to essentially that existing prior to ACTH therapy. He was readmitted to the hospital on January 5, 1950, for parallel studies with cortisone acetate. This was given intramuscularly in a dosage of 200 mg. a day for ten days (January 12 to 22). Again, as is evident in Figure 4, dramatic improvement occurred coincident with the change from the placebo to cortisone; after discontinuation of the

hormone, relapse occurred and within a two or three weeks period the pretreatment status was recognizable.

The characteristics of the joint fluid aspirated during the placebo period of the study, on January 9, 1950, There was an acute synovitis present in the fingers, the wrists, elbows, knees, ankles and feet; excess fluid was especially apparent in the knees. X-rays of the affected joints demonstrated extensive juxta-articular osteoporosis

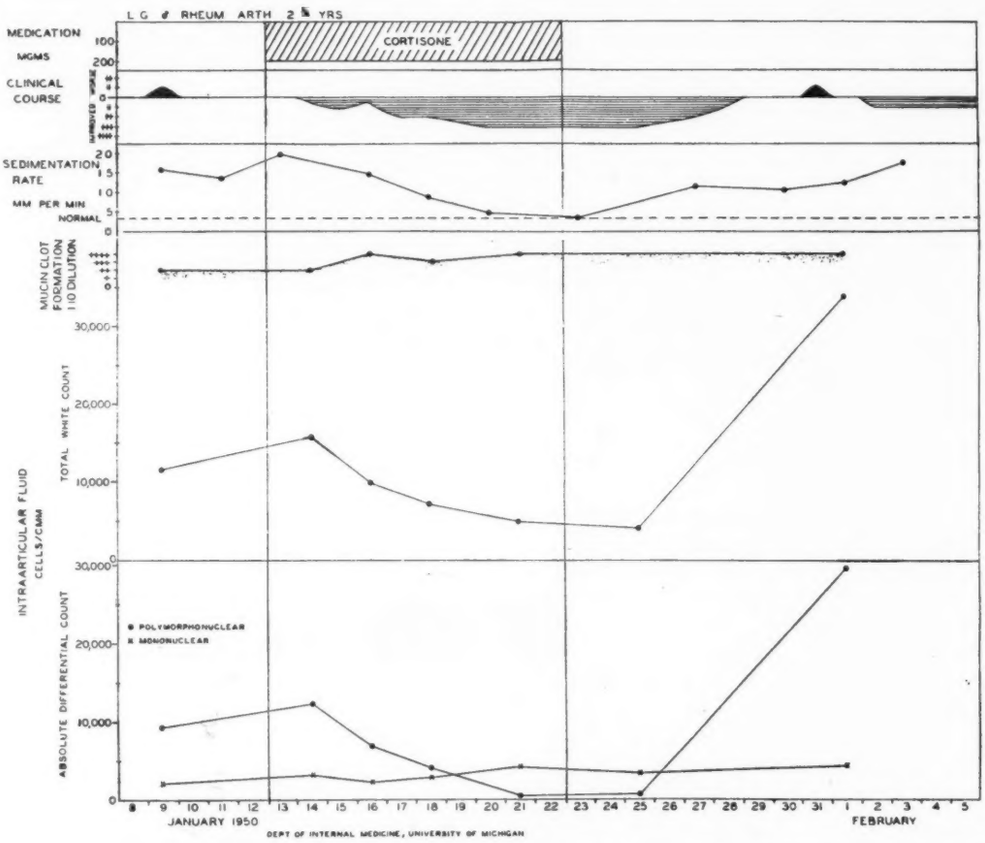


Fig. 4. Case 1, patient L. G. Changes in the findings in synovial fluid during intramuscular administration of 200 mg. cortisone acetate daily; correlation with general clinical effect and sedimentation rate (Rourke-Ernstene).

included a total white cell count of over 11,700 of which 8,890 were polymorphonuclear. The quality of mucin clot produced upon addition of dilute acetic acid was fair. In the period of systemic cortisone administration there was gradual but persistent fall in cell count to 4,250 on the sixth day, of which only 1,020 were inflammatory cells. This was accompanied by development of excellent mucin-clot formation. It is evident that these beneficial changes in joint fluid persisted for a few days after cortisone was discontinued. Within ten days, however, the cell count was again elevated (34,400) with the polymorphonuclear cell being again predominant. The excellent quality of mucin-clot formation was surprisingly well sustained.

Case 2. (Table II, Fig. 5)—L.R., a forty-eight-year-old Negro woman had been ill with rheumatoid arthritis for four years. In mid-December, 1952, subsequent to withdrawal of cortisone and ACTH, a severe relapse developed. When admitted to the University Hospital on December 24, 1952, she complained of pain, soreness and stiffness in multiple joints. It was very difficult for her to move about and take care of her personal needs. with cystic areas as well as moderate reduction of the joint spaces. The sedimentation rate (Westergren) was elevated to 135 mm. per hour. On the basis of the criteria of the ARA, progression was graded as Stage III and function as Class IV.

Beginning with the initial examination on January 9, 1953, serial aspirations were made from the left knee. The fluid was free of debris; the total polymorphonuclear cell count varied from 17,760 to almost 30,000. The relative viscosity was low, ranging from 5.59 to 18.9 units. Mucin-clot quality was good. Placeboes were given by mouth throughout this period without any obvious change in the sedimentation rate, symptomatic complaints or objective findings. During the course of her subsequent hospitalization she was allowed generous amounts of salicylates.

Through the period January 20 to 30, 1953, she received a free alcohol preparation of oral hydrocortisone in a dosage of 100 mg. per day; subsequent to this, gradual reduction in dosage was made to a level of 50 mg. per day. There was a dramatic response in her condition at the time the change was made from

TABLE II. EFFECT OF ORAL HYDROCORTISONE (FREE ALCOHOL) ON JOINT FLUID

Case 2. L. R. Reg. No. 742419 48-year old woman Rheumatoid arthritis 4 years' duration ARA Stage III, Class IV

RIGHT KNEE

Date	Dose Compound F mg./day	Sed. Rate (Westergren) mm./hr.	Total WBC Count per ml.	Absolute PMN Count per ml.	Mononuclear Cells per ml.	Relative Viscosity Units	Polysaccharide as Chondroitin-Sulphate mg./cc.	Log Viscosity / Polysaccharide Conc.	Mucin Clot 1:5
1953									
Jan. 9	None	125	20,000	17,974	2,926	13.9	1.0	1.0	+++
13	None	126	21,100	18,568	2,532	10.6	1.0	1.0	+++
14	None	130	32,350	29,672	2,678	18.9	1.2	1.1	+++
16	None	127	21,900	20,586	1,332	7.9	0.9	1.0	+++
19	None	134	22,100	18,564	3,536	5.6	0.6	1.2	++
20	None	135	22,500	21,600	900	11.0	1.1	1.0	+++
21	100	Joint not aspirated							
22	100		18,500	17,760	740	29.2	1.2	1.3	+++
23	100	132	5,350	4,119	1,231	14.8	0.8	1.4	+++
26	100	65	3,750	525	3,225	65.0	1.2	1.5	++++
28	100	89	1,400	252	1,148	QNS	QNS	QNS	QNS
30	100	87	750	300	450	143.8	1.1	2.0	++++
31	90	Joint not aspirated							
Feb. 2	90	60	550	0	550	261.7	1.4	1.7	++++
3	80	Joint not aspirated							
4	80	63	850	0	850	157.6	QNS	QNS	QNS
6	70	Joint not aspirated							
9	60	34	4,150	332	3,818	80.2	1.1	1.7	+++
11	60	30	600	0	600	64.3	1.2	1.5	++++
12	50	Joint not aspirated							
16	50	41	7,700	3,619	4,081	52.8	1.3	1.3	++++
17	50	63	13,400	9,648	3,752	44.3	1.4	1.2	+++

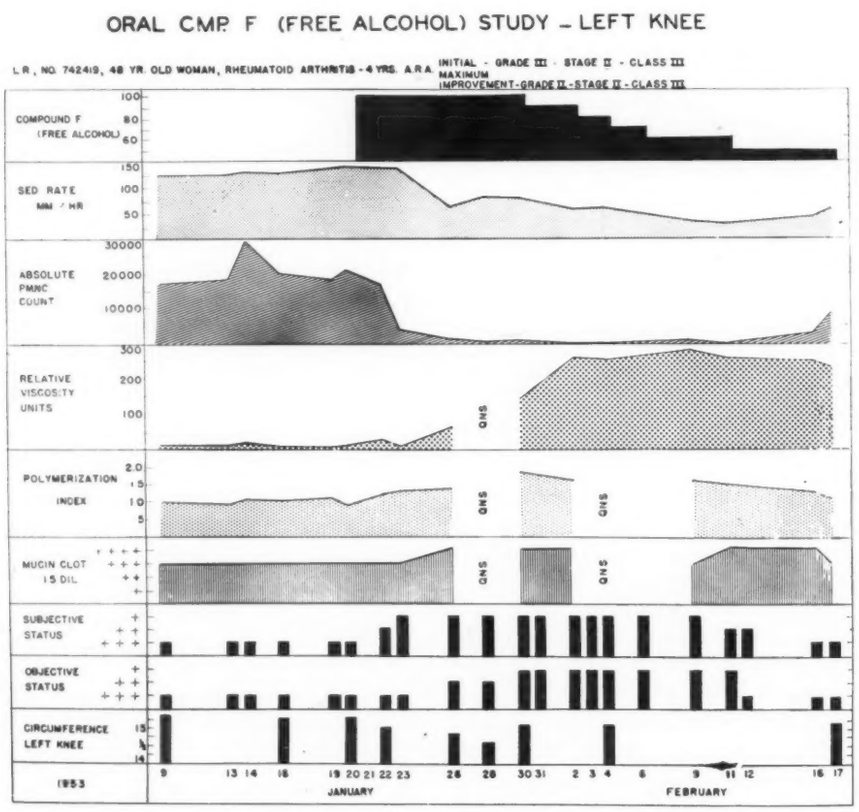

ORAL CMP. F (FREE ALCOHOL) STUDY – LEFT KNEE
L.R., NO. 742419, 48 YR. OLD WOMAN, RHEUMATOID ARTHRITIS - 4 YRS. A.R.A.
INITIAL - GRADE III - STAGE II - CLASS III
MAXIMUM IMPROVEMENT-GRADE II-STAGE II - CLASS III
COMPOUND F (FREE ALCOHOL)
SED RATE MM / HR
ABSOLUTE PMNC COUNT
RELATIVE VISCOSITY UNITS
POLYMERIZATION INDEX
MUCIN CLOT 1:5 DIL.
SUBJECTIVE STATUS
OBJECTIVE STATUS
CIRCUMFERENCE LEFT KNEE
QNS
1953
JANUARY
FEBRUARY

Fig. 5. Case 2, patient L. R. Changes in the joint fluid findings during oral administration of hydrocortisone (as free alcohol) to a forty-eight-year-old colored woman with active rheumatid arthritis, Stage II, Class III; correlation with clinical status and sedimentation rate (Westergren).

the placebo medication to 100 mg. of Compound F. At its height, improvement was graded as II; this was accompanied by a pronounced fall in sedimentation rate, which, however, never became normal. In association with these changes, there were marked alterations evident in the characteristics of the joint fluid. The absolute polymorphonuclear cell count dropped suddenly on the sixth day of treatment to 525; eventually it was reduced to zero. This was accompanied by marked improvement in relative viscosity and the de-

velopment of excellent mucin-clot formation. There was no convincing change in the mucopolysaccharide concentration; the "polymerization index," however, was almost doubled, coincident with disappearance of polymorphonuclear cells, rise in viscosity to over 150 units and development of excellent mucin-clot formation.

tenderness and pain on weight bearing; the range of motion was essentially normal. The Westergren sedimentation rate was elevated to 79 mm. per hour. X-ray examination of the knees was negative except for evidence of soft tissue swelling; the changes in the hands and feet consisted of cystic rarefaction and very slight

TABLE III. EFFECT OF ORAL HYDROCORTISONE (FREE ALCOHOL) AND CORTISONE ACETATE ON JOINT FLUID

Case 3. F. K. Reg. No. 718276 40-year old man Rheumatoid arthritis 2 years' duration ARA Stage II, Class III

Date	Joint	Total Cell Count per ml.	Absolute PMN per ml.	Absolute Mono. per ml.	Relative Viscosity Units	Relative Polysaccharide Concentration mg./cc.	Log Viscosity / Polysaccharide Conc.	Mucin Clot (1:5)
1951								
Dec. 19	Rt. Knee	15,150	13,938	1,212	3.71	0.59	0.96	++
Dec. 21	Hydrocort	isone starte	d, 50 mg. p	er day				
Dec. 31	Lt. Knee	12,800	7,936	4,864	3.57	0.66	0.83	0
1952								
Jan. 10	Rt. Knee	19,450	17,116	2,334	3.1	QNS	QNS	0
Jan. 15	Cortisone	acetate incr	eased to 10	0 mg. per d	ay			
Jan. 17	Rt. Knee	8,150	6,602	1,548	2.7	0.46	0.94	QNS

As was expected, partial clinical relapse became prominent when dosage of Compound F was reduced below 70 mg. per day. Deterioration in joint fluid characteristics was delayed somewhat longer. Ten days after the dose was reduced to 60 mg., the polymorphonuclear cell count of the synovial fluid had increased from zero to 3,618; this was accompanied by a fall in viscosity from 157 units to 52 units; the quality of the mucin clot remained excellent in this period.

While relatively large doses of these hormones produced prompt and convincing changes in the characteristics of the joint fluid, such alterations were not achieved with smaller dosages. In the above patient (Case 2), hydrocortisone in doses of 60 mg. per day was ineffective in sustaining the beneficial effect previously achieved by a dosage of 100 mg. per day. The failure of systemic cortisone and hydrocortisone in doses of 50 mg. daily to suppress the clinical manifestations in many patients with active rheumatoid arthritis is well recognized; in such a patient, the joint fluid changes were studied.

Case 3. (Table III)—F.K., a forty-year-old factory worker, described an episodic type of onset of rheumatoid arthritis which had remained confined to the hands for years until the knees became involved in 1949. Prior to admission to the University Hospital on December 13, 1951, he had been unable to work for one month because of spread of the disease into multiple joints. The general physical examination was negative with the exception of scatttered psoriatic lesions, generalized lymphoadenopathy and minimal splenomegaly. Multiple joints were involved by an active synovitis. Both knees were swollen by thickening of the periarticular structures and excess joint fluid; there was reduction of joint space. On December 19, 1951, 20 cc. of cloudy fluid, containing a moderate number of fibrin clots, were removed from the right knee; the cytological and physical characteristics of this specimen (Table III) were those expected in rheumatoid arthritis. According to the classification of the ARA, progression was placed in Stage II and function in Class III.

A short-term study was undertaken in this patient to contrast the effect of small doses of Compound F and cortisone. Accordingly, on December 21, 1951, he was started on 50 mg. (divided doses) of a free alcohol preparation of hydrocortisone; this was continued for twenty-one days; on January 10, 1952, he was changed to the same dosage of oral cortisone acetate, which was increased to 100 mg. per day on January 15. At the time of the last joint aspiration on January 17, he had been on cortisone for seven days. The effect of the steroids at the dosage level employed was disappointing in this patient. During the twenty-one days that the 50 mg. daily of the free alcohol preparation of hydrocortisone was administered and in the four day period that cortisone acetate was given in the same dosage, there was no evidence of symptomatic or objective benefit; the sedimentation rate was unchanged, the eosinophil count of the peripheral blood remained high. Definite symptomatic and objective evidence of response was evident within thirty-six hours after the dosage of cortisone acetate was increased to 100 mg. per day. Since aspiration of joint fluid was possible only at infrequent intervals during the study, it is possible that favorable but transient alteration in synovial fluid may have gone unrecognized. On those days, however, when fluid was removed, it is evident that the cytological and physical characteristics were unchanged at the end of eleven and twenty-one days, respectively, on 50 mg. daily doses of hydrocortisone. On the third day at the 100 mg. dosage there was some evidence of reduction in the total cell count; the physical features, however, remained unchanged.

Occasional observations on the joint fluid have been made on eight other patients receiving these hormones over long periods of time. The incidence and persistence of normal or nearly normal joint fluid characteristics in these patients has been disappointing and inconsistent. In two patients (L.K. and D.W.), treatment of one week's duration with a total of 560 mg. of ACTH in one and 850 mg. of oral cortisone acetate in another were associated with increasingly abnormal synovial fluid cytological features. In a third patient (E.G.), receiving 100 mg. daily doses of intramuscular cortisone acetate, very favorable changes were demonstrated in fluid removed from the left knee during first two weeks of treatment; these were not maintained, however, after seven months of treatment. In the fourth individual (E.W.) joint fluid was obtained from a knee, in which the rheumatoid process had become increasingly worse, despite three and one-half years of maintenance ACTH dosage; the cytological and physical features of this specimen were, in all respects, compatable with those observed in active and non-steroid treated disease. In a fifth patient (A.S.) receiving large doses of ACTH over a three months period, cytological improvement was well maintained; however the expected favorable alteration in physical characteristics did not develop despite the fact that the joint was clinically in a state of remission. In the sixth patient (R.E.), after thirty months of continuous oral cortisone acetate at a level of 62.5 mg. or more per day, moderate exacerbation of the rheumatoid process developed in the knees. Specimens from both joints had a relatively high cell count; the principal cell, however, was mononuclear; the physical features of the fluid were remarkably satisfactory. A similar situation was seen in the seventh patient (D.K.), who had received maintenance doses of oral cortisone for several months, despite which the knees became clinically more active. Fluid from both joints demonstrated a higher than normal cell count; in the specimen from the right knee, in which there were only mononuclear cells, the physical characteristics were very satisfactory; although the predominant cell in the fluid from the opposite knee was also mononuclear, this specimen had otherwise the characteristics of untreated rheumatoid arthritis. In the eighth patient (C.T.), despite the intra-articular injection of hydrocortisone acetate at intervals of four to seven days for a six months period, inconsistent synovial fluid changes had been achieved. With the addition of 100 mg. of oral cortisone to the regime, marked improvement in the cytological and physical characteristics was obtained over a period of two months. Despite continuation of intra-articular treatment, these changes were not maintained when the dosage of supplementary oral steroids was reduced to 40 mg. per day.

Joint Fluid Changes Observed in Association with Intra-Articular Steroids

The demonstration that local application of adrenocortical steroids was capable of suppressing wound healing[1] and inflammation[13] suggested that such local action might underly their effect on synovial inflammation in rheumatoid arthritis. We at first attempted to find a solvent for cortisone or cortisone acetate suitable for intra-articular injection, but were unable to inject ethanol or propylene glycol into rabbit joints without producing tissue damage. Therefore, studies were undertaken using the usual suspension available for intramuscular injection. In our experience, such preparations have been well tolerated when injected into the joint cavity.

Case 4. (Table IV)—J. H., a forty-one-year-old laborer, presented a two-year history of generalized joint pain and swelling which grew progressively worse, eventually requiring crutches for ambulation. Constitutional symptoms were marked. At the time of admission to the University Hospital on February 14, 1950, the wrists, and elbows were the site of active synovitis. Both knees were greatly swollen by excessive joint fluid and periarticular thickening; they were somewhat warm and very tender. Weight bearing and motion against resistance was very painful. There was a 20-degree flexion contracture with prominent quadriceps atrophy and weakness. X-ray examination of the knees demonstrated almost complete loss of cartilage and cystic osteoporosis. The sedimentation rate was elevated to 102 mm. per hour (Westergren); there was a moderate anemia. Eighteen and 45 cc. of cloudy fluid were removed from right and left knees, respectively. Increase in absolute polymorphonuclear cells largely accounted for the elevated total cell count; the quality of mucin-clot formation was inferior. On the basis of the criteria of the ARA, progression was regarded as Stage III and function as Class III. Throughout the period of hospitalization, the routine measures of conservative therapy, including adequate salicylate dosage and intensive physical therapy, were employed.

Following aspiration of fluid for examination 10 mg. of cortisone (free alcohol) in suspension was injected into the joint cavity of the left knee; this procedure was repeated daily for a total of eight injections. A convincing decrease in total cell count was not apparent

TABLE IV. EFFECT OF INTRA-ARTICULAR CORTISONE (FREE ALCOHOL) ON JOINT FLUID

Case 4. J. H. Reg. No. 676622 41-year old man Rheumatoid arthritis 2 years' duration ARA Stage III, Class III

Date 1950	Right Knee—Control							Left Knee						
	Days Since Last Injection	Dosage mg.	Total WBC per ml.	Absolute PMN per ml.	Absolute Mono-Nuclear per ml.	Mucin Clot 1:5	Relative Viscosity	Days Since Last Injection	Dosage mg.	Total WBC per ml.	Absolute PMN per ml.	Absolute Mono-Nuclear per ml.	Mucin Clot 1:5	Relative Viscosity
Mar. 1			16,800	14,952	1,848	++				14,250	11,400	2,850	+	
6			No aspiration						10 E	10,200	8,670	1,530	+	
7			No aspiration					1	10 E	12,200	9,516	2,684	+	
8			No aspiration					1	10 E	10,000	7,000	3,000	+	
9			No aspiration					1	10 E	10,200	7,140	3,060	0	
10			No aspiration					1	10 E	6,100	3,355	2,745	+	
11			No aspiration					1	10 E	6,450	4,063	2,387	++	
12			No aspiration					1	10 E	No aspiration				
13		Saline	22,500	19,575	2,925	+		1	10 E	11,350	5,788	5,562	+++	
14	1	Saline	25,750	23,175	2,575	+++		1	None	9,900	7,326	2,574	+++	
17	3	Saline	11,450	9,504	1,946	+	QNS	4	None	15,000	12,750	2,250	+++	5.6
22	5	Saline	9,700	7,663	2,037	+++	4.2	9	None	12,450	8,964	3,486	+	3.7
27	5	Saline	3,550	1,740	1,810	+++	2.7	14	25 E	12,650	10,625	2,025	+++	4.2
28			No aspiration					1	25 E	20,300	14,616	5,684	+	4.8
29			No aspiration					1	25 E	8,950	5,459	3,491	+++	5.1
30			No aspiration					1	25 E	7,850	3,689	4,161	+++	6.1
31	4	Saline	5,650	4,294	1,356	++	2.9	1	None	6,600	3,234	3,366	+++	7.8

until the fifth day of this procedure, after which the polymorphonuclear cells averaged about one-half of their base line value until twenty-four hours after the last injection. There was comparatively little change in the number of mononuclear cells. The quality of the mucin clot showed more gradual but more sustained improvement. At the end of the study at this dosage level, joint fluid from the control right knee showed no substantial change from the base line values.

During the next two weeks, normal saline was injected into the right knee on five occasions immediately following aspiration. The rather surprising fall in total cell count and polymorphonuclear cells seen was greater than we have observed in other control studies; it may be an effect of repeated aspirations, or an indication of the spontaneous variability of cell counts in the synovial fluid. There was also fluctuation in the mucin-clot test, but the relative viscosity remained low. During this period the left knee, previously injected with cortisone, showed gradual deterioration of joint fluid characteristics.

On March 27, two weeks after the last 10 mg. dose, cortisone injections into the left knee were resumed. For four consecutive days, 25 mg. of cortisone suspension was injected into the left knee; the opposite joint again served as a control. After two such injections there was a substantial drop in total nucleated cell count and in polymorphonuclear cells. The quality of the mucin clot appeared to improve, and the viscosity twenty-four hours after the last injection was slightly higher than any previous value.

During this study there was moderate symptomatic improvement in all joints and an increased sense of well being, commensurate with that frequently seen with hospitalization, nursing care, adequate dosage of salicylates and energetic physical therapy. There was no change in the sedimentation rate. Eosinophil counts were done on the peripheral blood prior to and four hours after the injections; no significant change followed either cortisone or saline injections.

Case 5. (Fig. 6, Table V)—H. W., a forty-four-year-old laborer, in 1938 developed generalized joint swelling and pain which continued with partial remissions and exacerbations characteristic of rheumatoid arthritis. For one month prior to admission to the University Hospital on December 14, 1950, crutches had been required because of pain and disability in the left knee. Objectively this joint was moderately swollen by excess fluid and thickening of the joint capsule; it was slightly tender but not excessively warm. Weight bearing and extension against resistance was moderately painful. Crepitus was present. There was moderate quadriceps weakness and a 15 degree flexion contracture. A low-grade chronic active synovitis was also present in the finger joints. The sedimentation rate was elevated to 48 mm. per hour (Westergren). X-ray examination of the left knee demonstrated marked decrease in joint space. On December 19, 1950, about 30 cc. of cloudy yellow fluid, containing a moderate quantity of fibrin debris, was removed from the left knee. The absolute polymorphonuclear cell count was 28,350; the relative viscosity was reduced to 7. By the criteria of the ARA, progression was graded as Stage III and function as Class III.

During his hospitalization, this patient received thirteen injections of 25 mg. each of cortisone acetate suspension into the left knee over a period of nineteen days. Fluid was aspirated for examination prior to each injection. Although there was a suggestive drop in polymorphonuclear cells after the first two injections, convincing decrease in the cell count did not appear until the seventh day, after a total of 150 mg. of cortisone acetate had been injected. Definite improvement in viscosity was not seen until the twelfth day, after a total of 225 mg. had been injected, and the highest viscosity value was obtained on the nineteenth day. The quality of the mucin clot also showed improvement. The improvement in cell count and viscosity were not maintained four days after the last injection. After discharge from the hospital on January 26, 1951, injections of cortisone acetate in doses of 50 to 62.5 mg. produced no significant changes in the joint fluid aspirated seven to eleven days later.

Throughout the study, the routine principles of con-

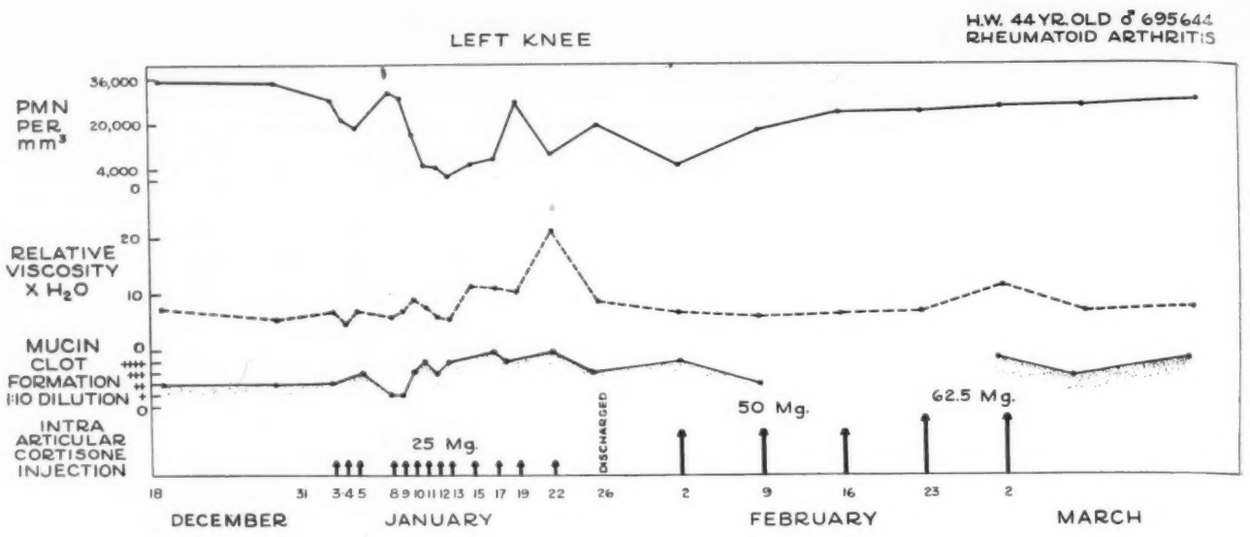


Fig. 6. Case 5, patient H. W. Changes in joint fluid following frequent injections of 25 mg. of cortisone acetate suspension into left knee of patient with active rheumatoid arthritis of twelve years' duration, Stage III, Class III. Note absence of significant changes with subsequent larger doses at weekly intervals.

TABLE V. EFFECT OF INTRA-ARTICULAR CORTISONE ACETATE ON JOINT FLUID

Case 5. H. W. Reg. No. 695644 44-year old man Rheumatoid arthritis 12 years' duration ARA Stage III, Class III

			LEFT KNEE				
Date	Day Since Last Injection	Dosage mg.	Total WBC per ml.	Absolute PMN per ml.	Absolute Mono-nuclear per ml.	Mucin Clot 1:5	Relative Viscosity
1950							
Dec. 19			35,000	28,350	6,650	+++	7.0
29			34,350	30,572	3,778	++	5.0
1951							
Jan. 3		25 E	28,400	26,412	1,988	++	6.5
4	1	25 E	21,400	19,046	2,354	QNS	4.3
5	1	25 E	18,550	15,582	2,968	+++	6.6
8	3	25 E	30,100	25,886	4,214	0	5.4
9	1	25 E	28,500	26,505	1,995	+	6.3
10	1	25 E	15,650	14,555	1,095	+++	8.7
11	1	25 E	4,750	3,563	1,187	+++	7.0
12	1	25 E	4,150	1,992	2,158	+++	5.6
13	1	25 E	1,650	Differential	not done	++++	5.1
15	2	25 E	5,400	2,160	3,240	QNS	11.0
17	2	25 E	7,000	5,250	1,750	++++	10.7
19	2	25 E	27,100	21,951	5,149	++++	10.0
22	3	25 E	9,150	5,216	3,934	++++	20.8
26	4	None	19,200	17,472	1,728	++	8.2
Feb. 2	11	50 E	4,150	3,818	332	++++	6.6
9	7	50 E	16,150	14,212	1,938	++	5.6
16	7	50 E	23,550	21,902	1,648	QNS	QNS
23	7	62.5 E	23,100	20,790	2,310	+++	6.3
Mar. 2	7	62.5 E	25,100	19,578	5,522	++++	10.8
9	7	None	25,150	20,623	4,527	+++	6.0
17	8	None	27,600	24,012	3,588	++++	6.8

servative therapy, including generous dosages of salicylates and appropriate measures of physical therapy were employed. There was moderate subjective and objective improvement in his general status. At no time, however, was there convincing objective evidence of improvement in the left knee beyond that expected from hospitalization and conservative treatment, and which could be specifically attributed to intra-articular cortisone. In particular, the striking symptomatic and objective improvement often associated with a single dose of intra-articular compound F was not observed. The study was finally terminated at the request of the patient.

When hydrocortisone became available, it was possible to make a critical comparison of the relative effectiveness of cortisone and hydrocortisone by intra-articular injection.

Case 6. (Fig. 7, Tables VI and VII)—E. C., a forty-four-year-old white laborer, had first developed symptoms of rheumatoid arthritis twenty years before. He had presented multiple joint involvement at the time of his first admission to University Hospital in 1941, and was seen on infrequent occasions for the next ten years.

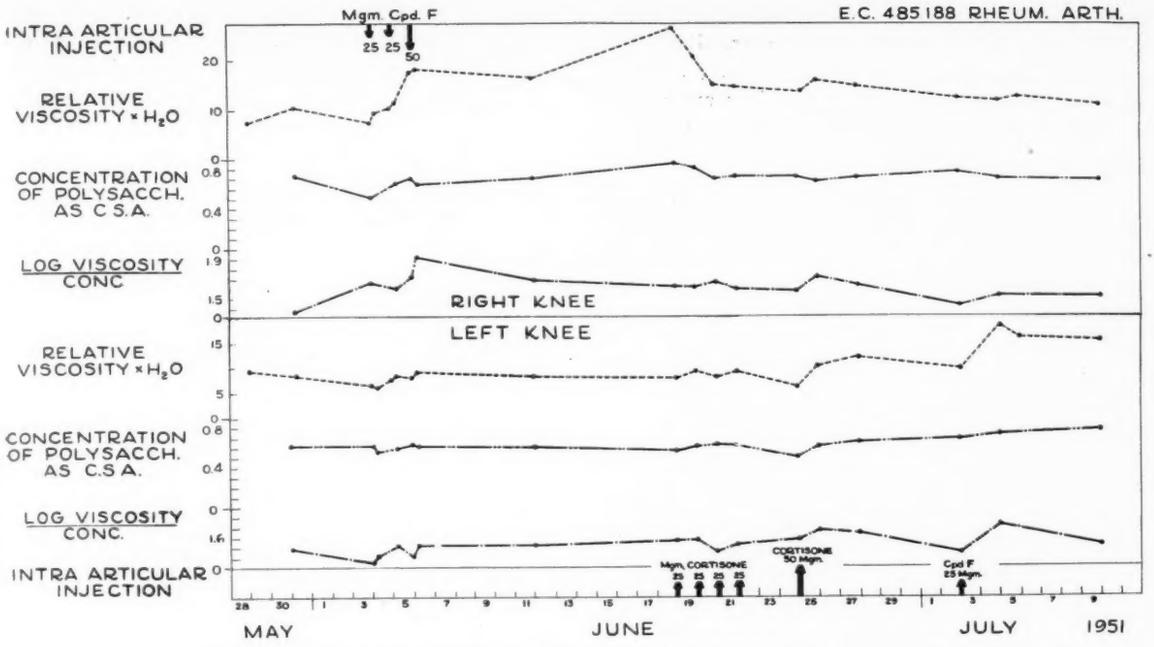


Fig. 7. Case 6, patient E. C. Comparative effects of hydrocortisone acetate (Cpd. F) and cortisone acetate (Cpd. E) on physical characteristics of the joint fluid in a forty-four-year-old man with rheumatoid arthritis of twenty years' duration, Stage III, Class III.

TABLE VI. COMPARATIVE EFFECT UPON JOINT FLUID OF HYDROCORTISONE ACETATE AND CORTISONE ACETATE

Case 6. E. C. Reg. No. 485188 44-year old man Rheumatoid arthritis ARA Stage III, Class III

Date 1951	Left Knee							Right Knee						
	Interval Since Last Injection	Comp. E and F mg.	Absolute PMN per ml.	Relative Viscosity	Polysaccharide as Chondroitin-Sulphate mg./ml.	Log. Viscosity / Polysacch. Conc.	Mucin Clot 1:5	Interval Since Last Injection	Comp. E and F mg.	Absolute PMN per ml.	Relative Viscosity	Polysaccharide as Chondroitin-Sulphate mg./ml.	Log. Viscosity / Polysacch. Conc.	Mucin Clot 1:5
May 29			2,800	9.4	QNS	QNS	++			13,573	7.6	QNS	QNS	++
31			1,760	8.6	.62	1.48	+++			16,277	10.6	.74	1.37	+++
June 4 10 AM			10,080	6.8	.61	1.35	++		25 F	6,063	8.3	.53	1.65	++
4 4 PM			6,232	6.8	.56	1.42	++	6 hrs.		3,686	9.3	QNS	QNS	++
5 10 AM			9,642	7.8	QNS	QNS	++	24 hrs.	25 F	5,428	10.5	QNS	QNS	+++
5 3 PM			6,142	8.1	.60	1.51	++	5 hrs.		5,106	12.6	.66	1.60	+++
6 10 AM			7,743	8.0	.64	1.41	++	24 hrs.	50 F	5,180	17.8	.72	1.72	+++
6 4 PM			3,395	8.8	.63	1.52	++	6 hrs.		1,622	15.5	.65	1.92	+++
12			7,087	7.2	.60	1.53	+++	6 days		6,012	16.0	.72	1.70	+++
19		25 E	4,293	8.3	.58	1.57	++	13 days		8,077	23.4	.87	1.64	+++
20	1 day	25 E	4,428	8.5	.62	1.57	+++	14 days		7,047	20.8	.82	1.62	+++
21	1 day	25 E	1,392	8.4	.63	1.46	++	15 days		2,092	15.0	.71	1.66	+++
22	1 day	25 E	3,696	9.2	.63	1.54	+++	16 days		8,502	14.8	.73	1.60	+++
25	3 days	50 E	6,460	6.6	.51	1.60	++	19 days		9,360	13.6	.72	1.58	+++
26	1 day		2,814	9.6	.61	1.68	+++	20 days		4,800	16.9	.70	1.73	+++
28	3 days		1,397	12.1	.65	1.65	+++	22 days		3,030	14.7	.72	1.63	+++
July 3	8 days	25 F	5,210	9.9	.70	1.50	++	27 days		6,582	12.1	.76	1.42	+++
July 5	2 days		2,380	17.0	.73	1.73	+++	29 days		4,544	11.9	.70	1.53	+++
6	3 days		3,036	16.3	QNS	QNS	+++	30 days		2,993	12.8	QNS	QNS	+++
10	7 days		9,504	15.0	.77	1.53	+++	34 days		4,959	10.7	.69	1.51	+++

His course had been one of gradual progressive incapacitation, with numerous exacerbations and partial remissions. A major exacerbation in the winter of 1950 had been controlled temporarily by systemic cortisone administration elsewhere, with partial relapse when it was discontinued. He was admitted to University Hospital on May 23, 1951, three months after discontinuation of cortisone. At this time, constitutional symptoms were prominent. Morning stiffness and weight bearing pain, especially in the knees, was very troublesome. Details of significance in the general physical examination included moderate hypertension, unilateral gynecomastia, and a palpable spleen. Multiple joints were involved by an active synovitis distinguished by excessive joint fluid, of which there was a tremendous collection in the knees; there was a bilateral flexion contracture. There was a moderate anemia; the sedimentation rate was elevated to 124 mm. per hour (Westergren). All joints, including

the knees, demonstrated considerable damage by x-ray, with resorption of sub-articular bone, narrowing of joint space and osteoporosis. On May 29, 1951, 50 cc. of straw-colored fluid, free of fibrin debris, were removed from each knee. Aside from the initial unusually low absolute polymorphonuclear cell counts in specimens from the left knee, the expected characteristics of rheumatoid arthritis were apparent. On the basis of the criteria of the ARA, progression was regarded as Stage III and function as Class III.

From June 4 to 19, the effects of injection of hydrocortisone acetate in the right knee were evaluated, with the left knee serving as a control. Injections of 25 mg. were made on two successive days, and 50 mg. were injected on the third day; aspirations were made twice daily in an attempt to obtain information as to the rapidity with which joint fluid changes developed. Convincing change in the relative viscosity developed twenty-four hours after the second injection of hydrocortisone, associated with a definite increase in the $\frac{\text{log. viscosity}}{\text{polysaccharide concentration}}$ The highest value for this index was obtained six hours after the injection of 50 mg. of hydrocortisone, although the highest viscosity reading occurred on the thirteenth and fourteenth days after the last injection into the right knee. The viscosity values fell gradually to approach base-line levels in three to four weeks. The changes in cell count were due chiefly to changes in polymorphonuclear cells. The drop in these cells six hours after the 50 mg. injection on June 6 is probably significant; other fluctuations were not clearly greater than seen in the frequent aspirations from the uninjected left knee. It should be noted that while there was considerable fluctuation in the cytologic findings in the control knee, values for relative viscosity, polysaccharide concentration and the index derived from them remained relatively constant.

The effect of cortisone acetate was then determined in the left knee, which had previously served as a control. Beginning on June 19, 25 mg. of this steroid were injected daily for four days; then after a lapse of three days, a single dose of 50 mg. of cortisone acetate was injected. The serial injection at the lower dosage level produced equivocal changes in the cell count and viscosity. However, the single 50 mg. was followed by a sharp fall in polymorphonuclear cells, a definite increase in viscosity and in the $\frac{\text{log. viscosity}}{\text{polysaccharide concentration}}$. These changes were well sustained for three days after the 50 mg. injection, but had disappeared eight days after injection. It was then demonstrated that the left knee was capable of responding to hydrocortisone. A single injection of 25 mg. of hydrocortisone acetate was followed by the highest values for viscosity and "polymerization index" obtained from the left knee during the study. The improved viscosity was well maintained seven days later. No steroid was injected into the right knee after June 6. The joint fluid findings on the right showed gradual deterioration to approximate pre-treatment levels at the end of one month and reflected no fluctuations related to the injections of either steroid into the left knee.

TABLE VII. EFFECT OF INTRA-ARTICULAR HYDROCORTISONE ACETATE AND CORTISONE ACETATE UPON PERIPHERAL BLOOD EOSINOPHIL COUNT

Case 6. E. C. Reg. No. 485188 Rheumatoid arthritis

Date	Site of Injection	Hormone Injected	Peripheral Blood Eosinophil Count		Percent of Fall
			Control	4 Hour	
1951					
May 28	Intramuscular	0.3 cc. Epinephrine	288	113	60.7
29	Intravenous	50 mg. E I.V.	188	16	91.4
31	Intramuscular	25 mg. ACTH I.M.	309	150	51.4
June 1	Left knee	Aspiration only	200	250	
4	Right knee	25 mg. F	363	97	73.2
5	Right knee	25 mg. F	300	200	33⅓
6	Right knee	50 mg. F	493	225	54.4
19	Left knee	25 mg. E	231	178	22.9
20	Left knee	25 mg. E	203	122	39.8
22	Left knee	25 mg. E	403	259	35.7
25	Left knee	50 mg. E	303	150	50.4
July 3	Left knee	25 mg. F	259	72	72.2

In general, the absence of change in joint fluid characteristics in the uninjected contralateral joint is the best evidence that these steroids exert their effect locally. In addition, the drop in absolute eosinophil count in peripheral blood was determined to check the possibility of a temporary systemic effect of these steroids after intra-articular injection. In Table VII, it is evident from control observations that this patient responded normally to ACTH and intravenous cortisone, and that no eosinophil drop followed simple aspiration. After injection of hydrocortisone into the joint, the decline in eosinophils sometimes exceeded 50 per cent. Such an effect was not consistently obtained with hydrocortisone, and was less frequent after cortisone. Aside from this suggestion that at times steroids injected into an inflamed joint may be quite rapidly absorbed into the blood stream, we have seen no other evidence of a systemic effect from intra-articular steroids as we have used them. In this particular patient, there was never any convincing clinical improvement in either knee in excess of that which might have resulted from hospitalization, analgesics and physical therapy. The sedimentation rate was not significantly altered.

TABLE VIII. EFFECT UPON SYNOVIAL FLUID OF SERIAL INJECTIONS OF HYDROCORTISONE ACETATE IN 35 JOINTS IN 24 PATIENTS WITH RHEUMATOID ARTHRITIS

	Pre-treatment Characteristics			Characteristics Upon Achievement of Maximum Viscosity			Difference**
	Range	Median	Mean±S.E.*	Range	Median	Mean±S.E.*	S.E. of Difference
Total Nucleated Cells per ml.	4,800-63,500	16,800	21,700±2,566	250-73,400	4,750	10,160±2,608	3.07
Polymorphonuclear Cells per ml.	1,390-57,800	14,900	18,500±2,432	0-69,770	1,275	7,700±2,448	3.14
Mononuclear Cells per ml.	278- 9,730	2,900	3,260± 376	247-8,630	2,180	2,440± 282	1.72
Relative Viscosity at 20° C	4.7-47.6	10.7	14.8±1.73	11.0-2,228	71.8	204± 68	2.79
Polysaccharide Concentration as chondroitin sulfate, mgm per ml.	0.57-1.14	0.94	0.89±.026	0.61-1.78	1.12	1.17±.044	5.38
Log. Viscosity / Polysaccharide Concentration	0.79-1.62	1.21	1.21±.037	0.89-2.34	1.58	1.62±.060	5.85
Mucin-Clot Test Excellent to Good in 1:5 dilution	74 per cent			97 per cent			2.89

*S.E. equals standard error.
**Difference between means divided by standard error of difference

In a three-year period since December, 1950, we have had the opportunity to critically evaluate the effects of repeated injections of hydrocortisone into 105 joints of sixty patients with rheumatoid arthritis. In thirty-five of these joints in twenty-four patients, serial observations on the joint fluid were made over a period of one month or longer. In many of the remaining patients failure of joint fluid to reaccumulate after a few injections precluded such observations; in some, further aspirations and injections were not justified because of lack of clinical benefit from the procedure. In these patients, the dosage at each injection was 25 or 37.5 mg.; on a few occasions 50 mg. was injected. Most of the patients received hydrocortisone acetate, but in some patients hydrocortisone as the free alcohol was used. In our experience there has been no apparent difference in the effect of these chemical forms of hydrocortisone, either on the joint fluid characteristics or the clinical benefit obtained. The intervals between injections ranged from two to thirty-two days, but in twenty-seven of the thirty-five joints was not more than eight days.

The essential information obtained from analysis of the characteristics of the several hundred joint fluids examined is summarized in Table VIII. Here the findings before treatment in each joint fluid are contrasted with the findings at the time that the maximum relative viscosity was obtained in the fluid from that joint. The median time required to achieve this maximum viscosity was thirty days, after a median total dosage of 112 mg. of hydrocortisone. In thirteen joints (37 per cent) this maximum alteration in viscosity was achieved after one to three injections, a total dose of 25 to 75 mg. of the steroid. Prior to treatment, the relative viscosity ranged from 4.7 to 47.6, with a median value of 10.7. The maximum viscosities attained during treatment ranged from 11.0 to 2,228, with a median of 71.8. At this time, there was also usually a distinct decrease in total nucleated cell count and in the absolute and relative numbers of polymorphonuclear cells. Prior to treatment, the median polymorphonuclear count was 14,915 per ml., and accounted for 89 per cent of the total nucleated cells; at time of maximum viscosity, the median was 1,275, which was 27 per cent of the median total cell count. Despite the "skewed" distribution of values for polymorphonuclear cells and relative viscosity due to a few very high values, the differences observed from the pretreatment levels are statistically significant, the likelihood of their occurring by chance being in the range of 1 to 100. The difference in number of mononuclear cells is not statistically significant.

The improvement in viscosity was associated with some increase in concentration of synovial fluid polysaccharide, which averaged 0.89 mg. per ml. before treatment and 1.17 mg. per ml. at time of maximum viscosity. Evidence that the increase in polysaccharide concentration can account for only a fraction of the increase in viscosity is furnished by the ratio $\frac{\text{log. viscosity}}{\text{polysaccharide concentration}}$. This value ranged from 0.79 to 1.62 prior to treatment, with a median of 1.21; at the time of maximum viscosity, the values for this ratio ranged from 0.89 to 2.34, with a median of 1.58. These differences are highly significant when subjected to statistical analysis. The possibility that the improved viscosity reflects a change in the characteristics of the protein-polysaccharide complex of the synovial fluid is supported by change in the quality of the

TABLE IX. CLINICAL EFFECTIVENESS OF SERIAL INJECTIONS OF HYDROCORTISONE ACETATE IN 105 RHEUMATOID JOINTS (60 PATIENTS)

No Response	No Sustained or Advanced Response	Sustained, Worthwhile Benefit
19% (20)	31% (32)	50% (53)

Average Dose:.....25-37.5 mg.
Average Duration of Benefit:.....7-10 days
Maximum Duration of Benefit:.....4-6 weeks

mucin clot formed on addition of dilute acetic acid. Prior to treatment, good to excellent mucin-clot formation was present in 74 per cent of samples; at time of maximum viscosity, this figure had increased to 97 per cent.

Clinical Effectiveness of Intra-Articular Hydrocortisone

Our clinical experience with intra-articular hydrocortisone from December, 1950, to December 1, 1953, is based upon careful study of the effect produced by 1,020 injections into 105 joints of sixty patients with rheumatoid arthritis. In the course of these observations, more than 32 grams of the steroid has been administered into the joints. All patients were observed at regular intervals, with careful recording of subjective and objective manifestations of their disease. In almost every patient, the joints treated represented the site of persistent active synovitis which had not responded satisfactorily to other forms of treatment, or joints contributing the major functional disability in patients with active but not incapacitating disease elsewhere. The accepted measures of treatment of rheumatoid arthritis as indicated for each individual patient were not withheld; these included hospitalization when necessary, adequate doses of salicylates, appropriate measures of physical therapy, orthopedic measures when indicated, and, in some patients, injection of gold salts. Of the sixty patients, only six were receiving systemic ACTH or adrenocortical steroids at the time of intra-articular treatment. Of the 105 joints treated, eighty-six were knees (82 per cent); the remainder were seven elbows, seven ankles, three wrists and two hip joints. Thirty-two of the patients were men, twenty-eight were women.

Intra-articular injections did not produce favorable subjective or objective clinical effect in twenty joints (19 per cent) in fifteen patients (Table IX). Sixteen were knee joints; two elbows, one ankle and one hip were also treated without success. All of these were injected at least three times at intervals of three to four days; the average dose per injection was 34 mg. In these instances there was no response to the initial and subsequent injections. In this group, four patients refused to continue treatment because of associated pain or because of discouragement by the lack of appreciable improvement.

In thirty-two joints (31 per cent) and eighteen patients, some degree of initial clinical improvement was obtained, but with continued treatment there was not significant progressive improvement or the benefits achieved during the first few weeks of treatment could not be maintained. In these patients, injections were eventually discontinued because the benefits were not regarded as worthwhile by the patients, by the physician, or by both. The joints in this group included twenty-five knees, four ankles, two wrists, and one hip. Thirteen joints (all knees) were injected only a few times; the initial response in each instance was encouraging, but was not significantly increased by second or subsequent injections. Six of the seven patients involved refused further injections. The remaining nineteen joints in eleven patients were injected over longer periods of time. Ten knees and three smaller joints received ten or more injections, with an average dose of 36 mg. per injection. Initially these joints showed a moderate degree of subjective and objective improvement, but in a relatively short time they had reached a plateau beyond which it was impossible to advance them despite protracted treatment.

In the remaining fifty-three joints (50 per cent) in twenty-seven patients, worth-while and sustained benefit appears to have been achieved. In this group there were forty-five knees, five elbows, two ankles and one wrist. In four of the smaller joints, sustained subjective and objective improvement followed one or two injections, and repeated injections were not required. Intra-articular injections into ten knees was successfully combined with orthopedic and physical medicine measures to correct flexion contractures, an average of six injections being required in each knee at two to fourteen-day intervals. In these patients the noteworthy effect of the injections was relief of pain. After the flexion contractures were corrected, it was possible to discontinue the injections without relapse.

We have been able to maintain personal super-

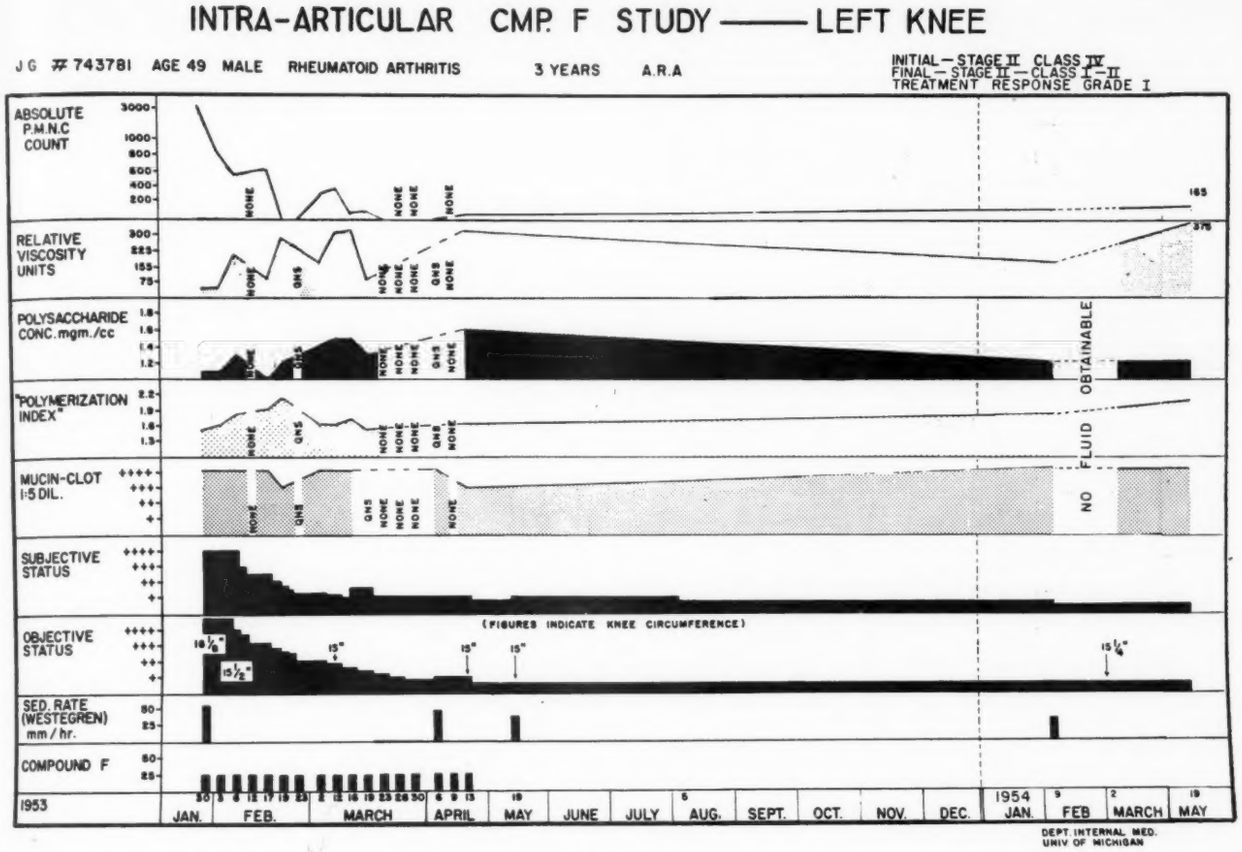

INTRA-ARTICULAR CMP. F STUDY —— LEFT KNEE
J G # 743781 AGE 49 MALE RHEUMATOID ARTHRITIS 3 YEARS A.R.A
INITIAL — STAGE II CLASS IV
FINAL — STAGE II — CLASS I—II
TREATMENT RESPONSE GRADE I
ABSOLUTE P.M.N.C COUNT
RELATIVE VISCOSITY UNITS
POLYSACCHARIDE CONC. mgm./cc
"POLYMERIZATION INDEX"
MUCIN-CLOT 1:5 DIL.
SUBJECTIVE STATUS
OBJECTIVE STATUS
(FIGURES INDICATE KNEE CIRCUMFERENCE)
SED. RATE (WESTEGREN) mm / hr.
COMPOUND F
OBTAINABLE
NO FLUID
1953
JAN. FEB. MARCH APRIL MAY JUNE JULY AUG. SEPT. OCT. NOV. DEC.
1954
JAN. FEB MARCH MAY
DEPT. INTERNAL MED. UNIV. OF MICHIGAN

Fig. 8. Case 7, patient J. G. Joint fluid findings in left knee and clinical course over a seventeen-month period in a forty-nine-year-old man with rheumatoid arthritis of three years' duration, initially classed as Stage II, Class IV. After three months of repeated injections of hydrocortisone into the knees, combined with general medical treatment and intensive physical therapy, this patient experienced a clinical remission which has persisted to date. On February 9 and March 2, 1954, 50 mg. of hydrocortisone were injected into each knee; these were inadvertently omitted from the figure.

vision for many months over sixteen patients in this group, in whom repeated injections have been made into twenty-seven joints. In fifteen of these joints, all knees, clinical benefit has been prolonged for at least two weeks after each injection. The injections were originally given at intervals of two to ten days, but after three to thirteen such injections (average seven) over a period of fourteen to seventy-five days (average thirty-eight), sustained benefit was prolonged for from fourteen to fifty-two days. The average dose of hydrocortisone was 30 mg. per injection. The total duration of treatment has ranged from five to eighteen months, with an average number of twenty injections into each joint. It must be emphasized that these patients still require repeated injections to maintain their comfort. At some time during the period of study, three patients have required more frequent injections into five joints because of relapse. In the remaining ten joints, once sustained benefit was achieved it has been maintained by injections no more often than every fourteen days.

The remaining twelve joints were in seven patients who appear to have undergone a remission of their disease while receiving intra-articular hydrocortisone. The initial pattern of treatment and response was similar to the preceding group, but after an average of five months they experienced subsidence of subjective and objective evidence of their arthritis, not only in the injected joints, but also in other involved joints which had not been injected. The knees were the site of injection in all of this group. The clinical remissions have persisted from five to sixteen months after the cessation of intra-articular injections. In four of these patients remission coincided with gold therapy, which is being maintained. None were receiving systemic hormone therapy. As yet, none of these patients has relapsed.

TABLE X. INTRA-ARTICULAR HYDROCORTISONE ACETATE AS AN ADJUNCT TO REHABILITATION

Case 7. J. G. Reg. No. 743781 49-year old man Rheumatoid arthritis 3 years' duration ARA Stage II, Class IV

Date	Left Knee								Right Knee							
	Interval Since Last Injection	Comp. F mg.	Total WBC per ml.	Absolute PMN per ml.	Relative Viscosity	Polysaccharide as chondroitin-sulphate mg./cc.	Log. Viscosity / Polysacch. Conc.	Mucin Clot 1:5	Interval Since Last Injection	Comp. F mg.	Total WBC per ml.	Absolute PMN per ml.	Relative Viscosity	Polysaccharide as chondroitin-sulphate mg./cc.	Log. Viscosity / Polysacch. Conc.	Mucin Clot 1:5
1953																
Jan. 30		25	6,400	3,776	47.6	1.1	1.5	++++		25	6,550	4,454	41.3	1.1	1.5	++++
Feb. 3	4 days	25	2,700	810	51.1	1.1	1.6	++++	4 days	25	6,750	6,075	108.1	1.1	1.9	++++
6	3 days	25	2,150	599	193.3	1.3	1.8	++++	3 days	25	300	36	1,682.6	clots	clots	++++
12	6 days	25		No fluid obtained					6 days	25	1,300	0	252.0	1.2	2.0	++++
17	5 days	25	4,300	602	87.6	1.0	1.9	++++	5 days	25	700	420	436.3	1.5	1.5	++++
19	2 days	25	350	0	279.5	1.2	2.1	+++	2 days	25	1,000	0	QNS	QNS	QNS	++++
23	4 days	25	1,250	0	QNS	QNS	QNS	QNS	4 days	25	725	0	QNS	QNS	QNS	QNS
Mar. 2	7 days	25	1,450	275	170.5	1.4	1.6	++++	7 days	25	2,050	184	QNS	QNS	QNS	++++
12	10 days	25	1,300	390	303.0	1.5	1.6	++++	10 days	25	1,700	680	223.6	1.6	1.5	++++
16	6 days	25	450	72	312.7	1.5	1.7	++++	6 days	25	550	55	261.6	1.4	1.7	QNS
19	3 days	25	900	90	76.4	1.3	1.5	QNS	3 days	25	650	117	QNS	QNS	QNS	++++
23	4 days	25		No fluid obtained					4 days	25		No fluid obtained				
26	3 days	25		No fluid obtained					3 days	25	300	60	QNS	QNS	QNS	++++
30	4 days	25		No fluid obtained					4 days	25	100	0	QNS	QNS	QNS	QNS
Apr. 6	7 days	25	450	0	QNS	QNS	QNS	++++	7 days	25		No fluid obtained				
9	3 days	25		No fluid obtained					3 days	25	450	36	613.6	1.3	2.1	++++
13	4 days	25	850	68	323.2	1.6	1.6	+++	4 days	25	350	14	QNS	QNS	QNS	QNS
1954																
Feb. 9	10 months	50	700	100	158.0	1.2	1.8	++++	10 months	50	850	680	QNS	QNS	QNS	QNS
Mar. 2	3 weeks	50		No fluid obtained					3 weeks	50		No fluid obtained				
May 20	9 weeks	None	600	0	616.0	QNS	QNS	++++	9 weeks	None	500	165	375	1.2	2.1	++++

The value of intra-articular hydrocortisone as part of a well planned rehabilitation program is well illustrated by the course of one of the patients in this group.

Case 7. (Fig. 8, Table X)—J. G., a forty-nine-year-old man, experienced the onset of rheumatoid arthritis in January, 1950, initially in the wrists but followed by rapid progression to involve both knees, feet, hands, and elbows. He had been unable to work for three years; a wheel-chair had been required for two years. At the time of admission to the University Hospital, January 23, 1953, although minimal synovial thickening and moderate deformity was present in other joints, the knees were involved by an active synovitis. Both knees were definitely swollen, with moderate thickening of the joint capsules and excess joint fluid; crepitus was absent. There was a flexion contracture of 10 degrees on the right and 20 degrees on the left. Quadriceps atrophy was marked while quadriceps strength was unable to support extension of the knees against gravity. He could pull himself to his feet but pain on attempted weight bearing was moderately severe. The sedimentation rate was elevated to 54 mm. per hour (Westergren). X-ray examination of the knees demonstrated marked spotty osteoporosis, in addition to severe reduction of the joint space, more marked on the left. The cytological and physical characteristics of the joint fluid, first aspirated on January 30, 1953, included a moderate increase in inflammatory cells, relatively good viscosity values (over 40 units) and excellent mucin-clot formation. By the criteria of the ARA, progression of the disease was placed in Stage II, function as Class IV.

Several factors were present in this patient to favor rehabilitation. The activity of disease process was moderate. Normal hip joints, preservation of function in the shoulders, feet, and ankles with a good hand grip allowed satisfactory use of crutches. His work record prior to the present illness had been excellent. And perhaps most important, he had an indomitable will to avail himself of all opportunities for rehabilitation. The intensive program undertaken drew heavily upon the available talents of this institution. Physical therapy was carried out daily, with attention directed at reducing the contractures of the knees and increasing quadriceps strength. During a period of hospitalization for one month, large doses of salicylates were administered. Intra-articular injections of hydrocortisone acetate were made into both knees, at a dosage level of 25 mg., at intervals of two to ten days over a period of two and one-half months. A total of 425 mg. was injected into each knee.

Changes in the synovial fluid characteristics were prompt and impressive. Suppression of polymorphonuclear cells and improvement in viscosity were seen after the first or second injection. A definite clinical response was not seen until after the fourth injection, and was evidenced by an increased range of motion and decrease in pain on attempted weight bearing. Thereafter the course was one of slow but progressive improvement. At the end of one month he was able to walk a few steps with the aid of braces and crutches. Objectively at this time the circumference of the knees had been reduced

by 1 inch, and quadriceps strength had increased to three plus (normal 4 plus). The flexion contracture of the right knee had been eliminated; on the left it persisted to an extent of 10 degrees. The improvement permitted his transfer to a convalescent unit, but intensive physical therapy and frequent injections of hydrocortisone acetate into the joints was continued.

Six weeks after beginning this program, the joint fluid characteristics had become virtually normal. The cytologic abnormalities were completely reversed, and consistently high values for viscosity were obtained. After this, it was frequently impossible to obtain sufficient fluid for complete examination.

After two months of this combined treatment, the patient was able to get about with the aid of two canes. The flexion contracture in each knee had been completely corrected, and quadriceps strength was normal. Objectively, the knees appeared normal except for slight synovial thickening. Pain on weight bearing was absent on the right, but persisted to a moderate degree on the left. After this the patient continued with physical therapy and salicylates at home.

The last intra-articular injections in this series were made on April 13, 1953. Six weeks later he reported progressive improvement in activity, although salicylates were required to control pain in the left knee on weight bearing. He was walking well with one cane. Objectively the improvement had been maintained in all respects. By August 5, 1953, he was walking without a cane and had been working full-time at a sedentary occupation. There was still some pain on weight bearing in the left knee controlled by frequent doses of aspirin. Objectively, there was no active synovitis in any joint, the knees showing only residual synovial thickening. The improvement, both in function and in objective findings has subsequently been well maintained. Ten months after the last injection of hydrocortisone, the essentially normal characteristics of the joint fluid were well maintained.

In February and March, 1954, 50 mg. of hydrocortisone acetate was injected on two occasions into each knee without convincing further effect. A flare-up in the right elbow in April, 1954, responded promptly to one injection of 50 mg. of the same preparation and did not require further injections.

Further details of our experience with the long-term use of intra-articular hydrocortisone are being reported elsewhere.[6a]

Discussion

The joint fluid alterations observed under the influence of adrenocortical steroids were reversal of abnormalities characteristic of rheumatoid arthritis, with changes in the direction toward a more normal pattern. It must be appreciated that as reversal toward normal became more nearly complete, inability to obtain sufficient fluid for study prevented observations when maximum effect of the steroids was most likely.

With systemic therapy, either resulting from adrenocortical stimulation or oral or intramuscular administration of cortisone or hydrocortisone, the joint fluid changes were evident only at high levels of dosage for short periods of time. Doses in the range considered safe for indefinite maintenance treatment did not result in convincing reversal of joint fluid abnormalities in those patients in whom excessive joint fluid persisted and could be obtained for study. With respect to dosage, there appeared to be definite association between the general clinical improvement and the degree of reversal of synovial fluid abnormalities.

Other workers have found inconsistent and variable changes in joint fluid characteristics following the intra-articular injection of cortisone or cortisone acetate.[2,6,7,8,14,21] Clinical effects also were unpredictable, and when they occurred were of short duration. In carefully controlled studies, Dixon and Bywaters[6] observed that at times intra-articular cortisone produced unequivocal improvement in the physical characteristics of synovial fluid such as we have observed. The impressive superiority of hydrocortisone and hydrocortisone acetate in its effect on both joint fluid abnormalities and clinical manifestations has been a uniform observation.[6,8,21] Recent studies on the fate of cortisone and hydrocortisone injected into the joint cavity suggests a difference in the way in which these two steroids are metabolized by the synovial cells.[9,15]

There is also general agreement that the results of intra-articular injection of these steroids can be disassociated from any resulting systemic effects. Evidence for this has been the fact that both clinical improvement and reversal of synovial fluid abnormalities are restricted to or predominate in the joints which were injected. The influence of these steroids presumably is exerted on the connective tissue cells which constitute the synovials.[12] Such an action at the connective tissue level may explain, at least in part, the favorable response in rheumatoid arthritis to systemically administered cortisone and hydrocortisone, and to adrenocortical stimulation.

Suppression of the inflammatory reaction in the synovial tissue by the local action of hydrocortisone is indicated by the drop in number of polymorphonuclear cells in the joint fluid, by the decrease in intra-articular temperature[10] and in tripeptidase activity[22] which have been observed to follow intra-articular injection, although decrease in the

inflammatory reaction has not always been observed in synovial biopsies.[2] The improvement in the physical characteristics of the joint fluid has usually been considered to result from suppression of synovial inflammation.[6,12] It is apparent that the increase in viscosity observed in these studies must reflect a change in the physical-chemical properties of the protein-polysaccharide component of synovial fluid. Assumption of such a change is required to explain the increase in ratio of $\frac{\text{log. viscosity}}{\text{polysaccharide concentration}}$ and the improvement in the quality of the mucin clot, observations which have been confirmed by others.[6,12] The findings are in accord with the explanation proposed by Ragan and co-workers[12,18] that in rheumatoid arthritis the connective tissue cells of the synovial membrane produce a poorly polymerized hyaluronic acid, and that the action of hydrocorticone permits them to produce a more normal (i.e., a more highly polymerized) product. Actually, present methods for determining the degree of polysaccharide polymerization are not sufficiently well developed to permit adequate testing of this hypothesis.

The fact that adrenocortical steroids can influence the characteristics of a connective tissue product has seemed important to us, even though the precise nature of the change induced cannot yet be accurately defined. It is possible that the changes observed are not entirely the result of suppression of the inflammatory process. The possibility of a more fundamental effect on connective tissue is suggested by the demonstration that the ground substance of connective tissue which is not inflamed can be altered by the local application of adrenocortical steroids.[5] Present knowledge regarding both the chemistry of connective tissue and the fundamental nature of the inflammatory process is insufficient to permit testing of this possibility.

Our experience with respect to the clinical usefulness of intra-articular hydrocortisone in the practical management of rheumatoid arthritis is in general agreement with the numerous reports of others.[2,4,8,14,21] Repeated injections, in some patients over long periods of time, have proved a worth-while addition to the treatment program in 50 per cent of selected patients in whom we have used them. Intra-articular therapy eliminates some of the dangers of long-term systemic administration of ACTH, cortisone or hydrocortisone because of the much smaller total dosage involved. It apparently does not interfere with spontaneous remissions, or with remissions which may be induced by other therapeutic agents.

The limitations of practical usefulness of intra-articular hydrocortisone stem from the facts that it is local therapy, and that the action is suppressive rather than curative. Because it is local treatment, its use is not practical in patients with extensive and multiple joint involvement. There is usually no direct effect on the constitutional manifestations of the disease. Control of activity of the rheumatoid process in treated joints can be associated with progression of the disease in other joints. In three of our patients, the maintenance of physical activity permitted by intra-articular injections of hydrocortisone into the knees for more than a year appears to have contributed to rapid progression of pre-existing disease in the hips.

In view of these limitations, it is obvious that intra-articular hydrocortisone should not be used as the sole therapeutic measure in rheumatoid arthritis. It represents an addition to and not a subsitute for sound management with emphasis on adequate rest, analgesics, maintenance of joint function and attention to the factors bearing on the general health of each individual patient. It has proved most useful in patients in whom one or a few large joints have been the major cause of disability. In such patients, suppression of the inflammatory activity by intra-articular hydrocortisone can often be combined with intensive physical therapy and orthopedic procedures. With such combined therapy, the improvement in functional ability is the most impressive result.

Summary

The abnormal characteristics of the synovial fluid in rheumatoid arthritis were found to revert toward a more normal pattern under the influence of adrenal-cortical steroids. With systemic therapy, by adrenocortical stimulation or oral or intramuscular administration of cortisone or hydrocortisone, these effects were most definite at high dosage levels. Following intra-articular cortisone, these effects were not obtained consistently and lasted only a few days. Following intra-articular hydrocortisone, such effects were more consistently obtained with small doses, and were better sustained. It appears that this effect of the steroids is exerted on the synovial membrane, and may account, at least in part, for the

favorable clinical effect of these agents in rheumatoid arthritis.

In addition to a decrease in polymorphonuclear cells, this reversion toward normal includes an increase in joint fluid viscosity attributable to an improvement in the physical chemical properties of the polysaccharide characteristic of synovial fluid, hyaluronic acid. Such changes indicate an effect of the steroids on connective tissue cells, where hyaluronic acid is presumably formed. These studies do not indicate whether the effect of the steroids at the connective tissue level is direct or secondary to suppression of inflammation.

Certain conclusions appear justified concerning the clinical usefulness of long-term intra-articular hydrocortisone acetate in rheumatoid arthritis. The procedure is not suitable as a single form of treatment in this disease; it must be combined with other accepted forms of therapy. When this was done in selected individuals with one or two joints which were refractory to other forms of treatment, intra-articular hydrocortisone injections were associated with sustained, worthwhile benefit in 50 per cent of the joints treated. When combined with special orthopedic and physical therapy measures, this procedure has proven a definite asset in the rehabilitation of selected individuals. In some joints worthwhile symptomatic and objective relief was eventually achieved for a period of four to six weeks before repeat injections were required. Upon discontinuing therapy, symptomatic benefit has persisted from four to eighteen months in 19 per cent of all treated joints. In the remaining instances the injections were eventually discontinued because of lack of benefit or inadequate response.

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Unusual Manifestations of Rheumatoid Nodules

Report of Three Cases

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ONE OF THE hallmarks of rheumatoid arthritis is the subcutaneous nodule. Such nodules are found in 5 to 25 per cent of cases of rheumatoid arthritis. They appear most commonly over the extensor surface of the forearm several inches below the elbow joint, but are also found over other bony prominences such as the patella, sacrum, spinous processes, and scapulae. Not uncommonly they are found along the tendons of the fingers and toes. They have been observed in the eye where they may perforate the sclera (sclero malacia perforans). Histologically similar lesions have been described in the pericardium, myocardium, in the rings and leaflets of the mitral and aortic valves. and in the splenic capsule, larynx, pleura and peritoneum.

Recently we have been privileged to observe three patients whose rheumatoid nodules present rather unusual features.

Case 1.—This thirty-six-year-old housewife* was in good health until the spring of 1952 when she slipped in the bathtub, "spraining" her right index finger. Within a week there appeared a puffiness of the flexor aspect of the remaining fingers of both hands. This was associated with stiffness so that she experienced difficulty in making a tight fist. At about this same time she became aware of an increase in palmar perspiration. Within a month of the onset there developed a mild migratory polyarthralgia involving the wrists, elbows, and shoulders but without objective manifestations. These symptoms persisted until November, 1952. At that time, while the patient was making a bed, there was an audible snap heard by the patient's husband across the room. The patient simultaneously experienced a sensation "like an electric shock" in the right thumb and wrist. She immediately noted that the right thumb was limp and that she was unable to voluntarily move it. Her physician was called and a splint was applied for a period of twenty-four hours. On its removal it was still not possible for the patient to extend the right thumb actively. Pain gradually disappeared over a period of several weeks and there was a more gradual partial return of strength and mobility.

About one week after this episode the patient became aware of a pea-sized nodule in the right mid-palm. Her physician felt that this was attached to the flexor tendon leading to the third digit. In May, 1953, there developed swelling, tenderness, and pain on motion in the right wrist. This represented the first appearance of objective joint manifestations. In June she began to have pain and tenderness in relation to the Achilles tendons. In August an oval, slightly elevated swelling, approximately 2 by 4 inches in size, appeared over the medial aspect of the lower third of the right leg.

When admitted to University Hospital on August 21, 1953, her complaints were of stiffness, which was generalized although most marked in the hands, pain on motion in the right wrist, and pain and tenderness in the Achilles tendons and across the metatarso-phalangeal joints of the toes. There was malaise and ease of fatigue, but other constitutional symptoms were absent.

Physical examination on admission revealed a well-developed, rather thin young white lady. Vital signs were normal as was examination of the eyes, ears, nose, pharynx, lungs, heart and abdomen. There were scattered telangiectases over the upper chest and erythema of the thenar and hypothenar eminences. Examination of the joints revealed moderate tenderness of the metatarso-phalangeal joints of all toes. There was slight swelling and tenderness in the proximal interphalangeal joints of the second and third fingers of both hands. A flexion contracture of about 15 degrees was present in the right third proximal interphalangeal joint. The metacarpo-phalangeal joints of both second and third fingers likewise showed slight swelling, tenderness, and pain on motion. The right wrist was moderately swollen and painful on motion, and was limited to ten degrees of palmar flexion and dorsiflexion. Over the medial aspect of the lower third of the right leg there was a poorly demarcated area of swelling roughly 4 by 8 cm. in size. Examination of the right thumb revealed inability to extend the distal phalanx actively, although there was a full range of passive motion. The usual subcutaneous bowstring formed by the extensor pollicis longus tendon on full extension of the thumb was absent. The tendon could be palpated distal to the wrist but was thought to be unattached.

Laboratory studies were as follows: urine examination normal, hemoglobin 12.2 gm. or 78 per cent, hematocrit 40, white blood count 7,700 with a normal differential. Sedimentation rate (Westergren) was 27 mm. per hour, corrected. L. E. cells could not be demonstrated. Serum Kahn reaction was negative. Basal metabolic rate was plus 9 per cent. Total serum cholesterol was 113 mg. per cent. Bromsulfalein test revealed 0.8 per cent retention after forty-five minutes. Other liver function

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During the period of these observations, Dr. Mikkelsen was a trainee of the National Institute of Arthritis and Metabolic Diseases.

*This patient was seen through the courtesy of Dr. Gordon Balyeat of Grand Rapids, Michigan.

tests were normal except for a 4-plus cephalin flocculation at twenty-four and forty-eight hours. X-ray examination revealed only juxta-articular osteoporosis of fingers and wrists.

On admission the patient was started on aspirin 0.65 gm. four times daily. This produced moderate relief of her tenderness and aching pain. When she awakened on the morning of August 28, the patient noted that she could not flex the left second finger at the proximal interphalangeal joint although it could be passively flexed without pain. She was seen by an orthopedic consultant who felt that the flexor digitorum profundus tendon had ruptured. Surgical repair, undertaken on September 3 by Dr. Carl Badgley, was technically difficult and it was recognized that prognosis for return of function should be guarded. At the time of the operation a section of the tendon approximately 1 cm. in length was found to be friable and gray in color, and was excised. Histologic examination of this material revealed small rheumatoid nodules in and adjacent to tendinous connective tissue. Fibrous bits from the operative site were reported as showing fibrinoid necrosis with palisading epithelioid cells at the periphery and an outer zone of lymphocytes and histiocytes (Fig. 1). A lymphocytic infiltration was present around one small blood vessel. A biopsy of the swelling on the right lower leg revealed an obliterating arteritis of small vessels in the adipose tissue and fascia. These changes were considered typical of active chronic rheumatoid arthritis.

The patient was discharged from the hospital September 8 on a conservative program of aspirin 0.65 gm. four times daily, paraffin baths to the hands, and exercise. On September 15 cortisone, 50 mg. daily, was started. There was prompt relief of aching and stiffness, and the swelling in the fingers and right wrist subsided. Examination on October 14 revealed approximately 50 per cent function of the superficial tendon without definite evidence of function of the deep tendon. On December 8 the patient was switched to hydrocortisone, 40 mg. daily. After one week dosage was decreased to 20 mg. per day where it has been maintained. Her general course has been excellent, and to date no new nodules or evidence of tendon involvement has appeared.

Case 2.—This sixty-three-year-old housewife had a history of gradually progressive rheumatoid arthritis of twenty-one years duration. In spite of multiple joint deformities she had been able to care for herself until three months before her admission to University Hospital on August 11, 1953. From August, 1952, until three weeks before admission she had received cortisone therapy; it was not possible to obtain details regarding dosage or the manner in which it was withdrawn.

Physical examination revealed a pale, chronically ill elderly female. The temperature was 97.8 degrees and blood pressure 90/70. Examination of the eyes revealed severe scleromalacia perforans bilaterally with a corneal ulcer approximately 1 mm. in diameter in the right eye. In the right eye superiorly there was an actual protrusion of the choroid. The upper jaw was edentulous. Examination of the lungs was normal. The left border of cardiac dullness was outside the mid-clavicular line. Cardiac rhythm was grossly irregular and a pulse deficit was readily demonstrable. No murmurs were heard. Abdominal examination was not remarkable. There was a necrotic ulcerating decubitus measuring 8 by 8 cm. over the sacrum. The

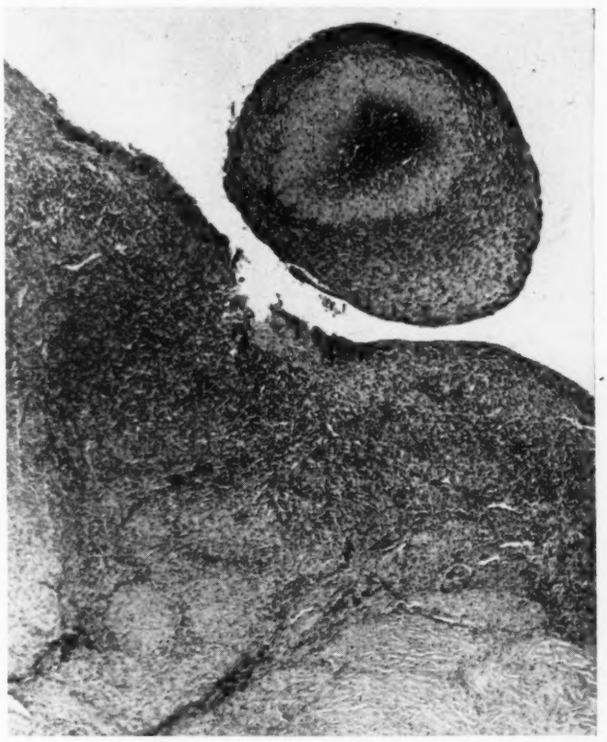

Fig. 1. Case 1. Tissue removed from site of tendon rupture at time of surgical repair. At the bottom is tendinous connective tissue and peritenon with a moderate degree of lymphocytic infiltration. Above is a nodule arising from peritenon demonstrating the typical histologic structure of a rheumatoid nodule. There is a central basophilic area of fibrinoid necrosis surrounded by a lighter zone of radially arranged epithelioid cells and an outer capsule of fibrous connective tissue containing lymphocytes and histiocytes.

hands showed typical rheumatoid deformity with extension at the proximal interphalangeal joints and flexion and ulnar deviation at the metacarpophalangeal joints. There was evidence of an active synovitis involving the ankles, knees and elbows. Subcutaneous rheumatoid nodules were present over the flexor surfaces of both forearms just distal to the elbow and over the extensor surfaces of the legs just below the knee joints. There was a pitting edema of the lower extremities and posterior trunk. Vibratory sense was impaired in the lower extremities.

Laboratory studies revealed a hemoglobin of 9.7 gm., red cells 4,050,000, white cells 10,000 with 94 per cent polymorphonuclear cells and 6 per cent lymphocytes. Urinary specific gravity was 1.019, albumin and sugar were absent, microscopic examination revealed 3 to 4 red cells per high power field and an occasional granular cast. Total serum proteins were 5 per cent with al-

bumin 2.7 per cent and globulin 2.3 per cent. Chest x-ray confirmed the cardiomegaly and revealed three spherical pulmonary lesions in the right lung. The uppermost of these appeared to be excavated and one of the remaining lesions was thought to show definite

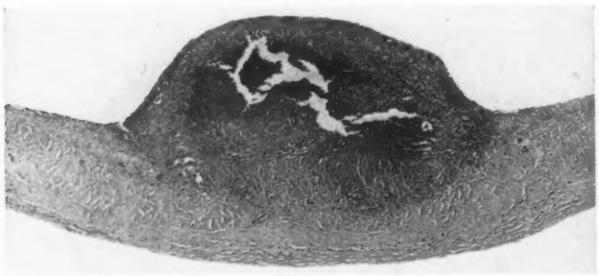

Fig. 2. Case 2. Dura mater, showing central fibrinoid necrosis, surroundings palisade of epithelioid cells and outer zone of fibrous connective tissue containing polymorphonuclear leukocytes, lymphocytes, histiocytes, plasma cells, and giant cells of the Touton type. The dura grossly was studded with nodules averaging 2 mm. in diameter, but in areas forming coalescent plaques as large as 5 cm. in diameter.

cavitation. There was roentgen evidence of advanced destructive changes, characteristic of rheumatoid arthritis, involving all of the peripheral joints.

The patient's hospital course was steadily downhill. She was digitalized and given ammonium chloride and mercurial diuretics. Culture of material from the decubital ulcer revealed E. coli, B. alkaligenes, coagulase-positive staphylococci, gamma-hemalytic streptococci, and clostridium species; tubercle bacilli could not be demonstrated. These organisms were found to be relatively sensitive to terramycin, and on August 15 terramycin, 500 mg. every six hours, was started. The patient was placed on a Stryker frame and turned frequently. Alternate moist saline and dry dressings were applied to the ulcer. On August 17 a friction rub was heard along the left sternal border. An electrocardiogram revealed very small QRS complexes and flat T waves in all limb leads. A pericardial effusion was suspected and on August 18 75 cc. of a serosanguinous fluid was aspirated. On August 19 an additional 250 cc. of similar fluid was obtained, which proved to be sterile on bacteriologic examination, including culture for tubercle bacilli. The blood pressure remained low and the possibility of adrenal insufficiency was suspected. On August 19 50 cc. of whole adrenal cortical extract was administered intravenously without apparent benefit. Respiration ceased the following morning.

The gross and microscopic post-mortem observations on this patient are the subject of a separate report by Dr. J. A. Maher,[10] department of pathology, to whom we are indebted for the following descriptions and illustrations. On examination of the cranial contents, firm white nodules each measuring about 2 mm. in diameter were present in the dura. The distribution was generalized and did not appear to have a relationship to blood vessels. In some areas the nodules coalesced to form granulomatous plaques as large as 5 cm. in diameter. No lesions were found in the brain.

Fibrinous pericarditis with 100 cc. of cloudy pericardial fluid was found. The heart weighed 280 grams. The base of the aortic valve cusps was thickened, and brown atrophy of the myocardium was noted. There was also fibrinous pleuritis. Parenchymal pulmonary nodules approximately 1 cm. in diameter were present and some of them had necrotic centers. Similar foci were noted in the bronchial lymph nodes. Nodules were present in the capsule but not in the parenchyma of the spleen. No lesions were noted in the liver, pancreas, or gastrointestinal tract. Additional findings included gall stones, arteriosclerotic nephropathy with papillary necrosis, depletion of adrenal cortical lipids, and polypoid hyperplasia of the endometrium. Tissue was obtained from the synovia of the right knee joint and from the subcutaneous nodule over the left ulna. Permission to remove the eyes was granted.

On microscopic examination, the dural rheumatoid nodules showed central fibrinoid necrosis surrounded by a zone of palisading epithelioid cells (Fig. 2). Peripheral to the epithelioid zone there was a third zone composed of polymorphonuclear leukocytes, lymphocytes, plasma cells, histiocytes, and giant cells of the Touton type. In some areas the necrotic foci became confluent. No inflammatory process was present in the inner meninges or brain. In the heart, rheumatoid nodules were found in the annulus fibrosa near the base of the valves, adjacent to a coronary artery, and in the thickened pericardium. These were similar in all respects to the dural nodules (Fig. 3). Fibrinous pericarditis, moderate coronary atherosclerosis, a marked increase in the Abnutzungspigment at the poles of the myocardial nuclei and degenerative fatty infiltration were also present.

In the lungs two large nodules, which were considered rheumatoid, were present in addition to an area of old caseation necrosis which appeared to have eroded into a small bronchus. However, no typical active tubercles were noted and acid-fast stains revealed no tubercle bacilli. Hyalinized areas of anthracosilicosis and necrotic rheumatoid nodules were found in the bronchial lymph nodes. Rheumatoid nodules were present in the thickened splenic capsule. No hepatic parenchymal nodules were present. The subcutaneous nodule from the left ulna consisted chiefly of hyalinized scar tissue with giant cells, and areas of necrosis with cholesterol clefts. This presumably was originally a subcutaneous rheumatoid nodule; such cholesterol clefts have been noted in previous reports.[6]

The entire sclera of both eyes was the site of extensive involvement with typical rheumatoid nodules which frequently became confluent (Fig. 4). The inflammatory process did not involve the cornea or uveal tract but began abruptly at the limbus and extended to the margins of the optic nerve. A rheumatoid nodule was also present in a small nerve near the optic nerve, probably a ciliary nerve, and a nodule was present in an extraocular muscle.

Synovial tissue from the knee joint consisted of hyalinized scar tissue covering the articular surface,

containing a few epithelioid and giant cells with scattered wandering cells.

Case 3.—This fifty-one-year-old welder was in good health until 1942 when he developed episodic migratory polyarthritis. This was characterised by the sudden appearance of severe pain and inflammation in one or several joints with complete return to normal in a period of two to five days. This course, which was considered compatible with gout, continued until July, 1948, when the ankles, wrists and finger joints became swollen, red, warm and tender. Involvement of these joints persisted and the patient was seen at University Hospital in August, 1948. Physical examination was not remarkable except for the presence of active synovitis in the proximal interphalangeal and metacarpophalangeal joints, wrists and ankles. Rheumatoid nodules were present on the right tibia, lower sternum and in both olecranon bursae. Serum urate level was 2.9 mg. per cent. Sedimentation rate (Westergren) was 32 mm. per hour, corrected. X-ray examination revealed early rheumatoid changes in hands and feet. Therapy consisted of salicylates, physiotherapy and increased rest. Gold was administered from October, 1948, to March, 1950, when it was discontinued because of the appearance of a pruritic erythematous skin eruption. A second course of gold (May to September, 1950) was stopped because of a recurrence of the dermatitis. Adrenocorticotrophic hormone, 20 to 80 mg. daily, was given from February, 1951, to August, 1952, with only partial suppression of the rheumatoid process. Because of failure to do well on conservative measures a third course of gold was started in August, 1952. This has been continued, in combination with adrenal steroid hormones in doses of 30 to 50 mg. daily, to the present without complication.

During this period of observation it was noted that the rheumatoid nodules, which also appeared over the patellae and extensor aspect of both forearms, fluctuated in size and intensity of inflammation as the activity of the rheumatoid process elsewhere varied. Examination of a nodule removed from the left forearm in March, 1952, revealed a typical rheumatoid nodule with moderate basophilism of the central necrotic zone suggesting lime salt deposition.

Early in 1952 the patient developed hoarseness attributed to inhalation of metal fumes in his employment as a welder. These symptoms persisted, however, and became progressively more severe. In August, 1954, a consultant from the department of otolaryngology observed a small cystic nodular lesion, 1 to 2 mm. in diameter, in the substance of each vocal cord at the junction of the anterior and middle thirds. These were thought to be atypical "speaker's nodes." On October 11 the lesion of the right vocal cord was removed under direct laryngoscopy by Dr. J. R. Chandler. Histologic examination of the material thus obtained revealed a hyperplastic stratified squamous mucosa. In the submucosa there were focal areas of necrosis and lime salt deposition surrounded by an epithelioid zone and an outer area of fibrous connective tissue and inflammatory cells (Fig. 5). The appearance was remarkably similar to that of the subcutaneous nodule removed previously. Postoperatively the patient's voice has been improved and stronger although still hoarse in character. When examined on December 1, 1954, both vocal cords had a smooth free margin and normal motility. There was a barely perceptible scar on the superior surface of the right cord and the previously described nodule on the left cord. No further operative procedure was recommended.

Fig. 3. *(above)* Case 2. Myocardium, showing multiple areas of fibrinoid necrosis with moderate lymphocytic infiltration peripherally.

Fig. 4. *(below)* Case 2. Sclera, illustrating again the typical three-zone structure of a rheumatoid nodule. Within the area of fibrinoid necrosis are partially intact collagen fibers.

Discussion

The first of these cases was of interest in that multiple spontaneous ruptures of tendons occurred relatively early in the course of the disease, before objective joint manifestations became apparent.

Fig. 5. Case 3. Submucosa of vocal cord, illustrating central area of necrosis and lime salt deposition with a surrounding epithelioid zone and peripheral lymphocytic infiltration.

Ansell and Bywaters[1] have recently reported three cases in which finger contractures due to tendon lesions were the initial manifestation of rheumatoid arthritis. Tendon involvement is a frequent accompaniment of established rheumatoid arthritis, having been found in 48 per cent of 391 cases by Edstrom[4] and in 42 per cent of 100 cases by Kellgren and Ball.[7] Spontaneous rupture of tendons in rheumatoid arthritis has been described but is certainly uncommon. Harris[5] was able to collect five cases of spontaneous rupture of the tendon of the extensor pollicis longus complicating rheumatoid arthritis. All five occurred during normal everyday activity and at a time when the disease exhibited activity (as demonstrated clinically and by elevation of the sedimentation rate) and had been present for from one and one-half to ten years.

It was thought, on the basis of histologic examination of material removed at the time of surgery, that the tendon rupture in the present case had occurred at the site of a rheumatoid nodule. At present there is no therapeutic agent capable of regularly bringing about the healing of established rheumatoid nodules. Although such nodules have been observed to decrease in size under cortisone or ACTH therapy,[11] recent studies would tend to support the view that hormonal therapy fails to produce any consistent modification of the principal histologic pattern.[15] In view of the fact that it has been unusual in our experience to observe the appearance of new nodules during hormonal therapy, it was decided to treat the present patient with steroids. It is not yet possible to determine whether this approach will prevent further tendon involvement.

The nodules in the second case illustrate the widespread involvement of connective tissue which may occur in rheumatoid arthritis. These nodules were typically rheumatoid and distinguishable from tuberculous and luetic lesions on the basis of histologic characteristics and anatomic distribution. There was no clinical information suggestive of tuberculosis or syphilis; search of the histologic lesions for acid-fast organisms and *Histoplasma capsulatum* was negative. The dural lesions presented the accepted histologic features of other extra-articular lesions in patients with rheumatoid arthritis. The peripheral neural, subcutaneous and ocular involvement are not infrequent manifestations of this disease. We, and others,[2] have seen similar pericardial lesions in other patients who have had rheumatoid arthritis.

Withdrawal of cortisone, especially if abrupt, has been observed to produce a panangiitic and panmesenchymal reaction which may simulate a flare of rheumatoid arthritis or disseminated lupus erythematosus or polyarteritis nodosa.[3,9,13,14] The following features suggested that such a reaction may have occurred in the present case: (1) the recent withdrawal of cortisone therapy, (2) the ensuing abrupt terminal course, (3) pericardial effusion, (4) corneal ulceration and staphyloma, (5) decubital ulceration, and (6) necropsy findings of unusually widespread rheumatoid nodules.

Examination of the larynx of the third patient revealed nodular lesions which were considered atypical "speaker's nodes" (chorditis nodosa). Surgical material from the right vocal cord contained typical rheumatoid nodules in the submucosa. The histologic structure was essentially identical with that of a nodule removed previously from the left forearm. "Speaker's nodes" are among the most common benign lesions of the larynx. They are usually located, as were the lesions in this case, on the superior surface of the vocal cords at the junction of the anterior and middle thirds. The etiology is thought to be improper or excessive use of the voice. The standard textbooks of otolaryngology do not mention rheumatoid nodules in the differential diagnosis although Lederer[8] lists "rheumatic diatheses" among the etiologic factors of chronic nonspecific laryngitis. Raven, Weber and Price[12] reported the

case of a sixty-two-year-old woman with rheumatoid arthritis and numerous subcutaneous nodules who developed inspiratory strider and progressive loss of voice, which became indistinct and croaking in character. Postmortem examination revealed unusually widespread distribution of necrobiotic nodules in viscera and striated muscle. Although the vocal cords appeared normal, submucosal nodules were found in the region of the glottis and epiglottis. We have been unable to find any other reference to the occurrence of rheumatoid nodules in the larynx or on vocal cords.

Summary

Three cases of rheumatoid arthritis are described in which rheumatoid nodules presented rather unusual features. In the first of these tendon involvement with spontaneous rupture of the right extensor pollicis longus tendon appeared as the initial manifestation of the disease. Histologic examination of material obtained during surgical repair of a subsequently ruptured tendon revealed a typical rheumatoid nodule at the rupture site. Steroid therapy has been undertaken in the hope of minimizing nodule formation and avoiding further tendon ruptures.

The second patient was observed during her brief terminal course which followed withdrawal of cortisone therapy. Postmortem examination revealed rheumatoid nodules in the subcutaneous tissues, lung parenchyma, splenic capsule, annulus fibrosa near the base of the aortic valves, pericardium, sclera, in one of the ciliary nerves, in extraocular muscle, and in the dura. To our knowledge, the occurrence of typical rheumatoid nodules in the dura has not been reported previously.

Because of persistent and progressive hoarseness the third patient was examined in the department of otolaryngology where lesions thought to be atypical "speaker's nodes" were observed on each vocal cord. Microscopic examination of material removed surgically from the right vocal cord revealed rheumatoid nodules remarkably similar in appearance to a previously removed subcutaneous nodule. We have been unable to find any previous report of the occurrence of rheumatoid nodules on the vocal cords. The occurrence of persistent hoarseness in a patient with rheumatoid nodules and subcutaneous nodules should suggest the possibility of rheumatoid nodules in the larynx.

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Prenatal Development and Growth of Bones in Man

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ONE OF THE most fascinating features of bone growth is the manner in which shape is maintained as growth takes place. Long bones such as the humerus, for example, when first formed in cartilage already resemble the adult in form and arrangement, and the general proportions are maintained as length and width increase. The ordinary textbook accounts rarely give an accurate explanation of this process. Scattered reports in the older literature and recent morphological and experimental work in lower animals[3,8,9] indicate that one of the most important features is removal of bone from the external surface of the metaphysis and deposition of bone on the internal surface of the shaft in the same region. Surprisingly enough, there has been no comprehensive account of such processes in man. Various bones have been reported on in detail for certain parts of the prenatal period[1,7,11,14] but rarely with reference to general growth processes. Nor have differences between man and those animals commonly used in experimental work been emphasized.

This paper describes briefly the development, ossification and growth of the human humerus during the prenatal period. There is a comprehensive account of the entire human skeleton now in press elsewhere,[4] which is based on the literature and on personal observations of an extensive series of human embryos and fetuses. In the interests of space, it was decided to limit the present paper to a discussion of a typical long bone. Since the reference mentioned above[4] contains an extensive bibliography, no attempt is made to duplicate it here.

Ossification and Growth

Osteogenesis is an inclusive term, referring to all of the factors concerned with the formation and growth of bones as organs. Ossification is but one phase of osteogenesis and is a process which is fundamentally similar wherever it occurs. All bones begin as mesenchymal condensations which appear early in the embryonic period. Some are predominantly fibrous; ossification in them forms membrane or dermal bones. Most condensations, however, are more cellular, and they become cartilages which are then replaced by bone.

Cartilage Bones — Periosteal and Endochondral Ossification.—In the case of the humerus, and other long or tubular bones as well, the sequence of changes may be outlined as follows, bearing in mind that these stages are not sharply separated.

1. A cartilage model forms. This grows until a center of hypertrophied cartilage cells is present in the center of the shaft.
2. A primary bone collar forms.
3. Phosphatase appears in the zone of hypertrophied cartilage and matrix calcifies.
4. The bone collar is eroded and cartilage removal begins.
5. Cartilage removal and periosteal bone formation extend longitudinally. Endochondral bone formation begins.
6. Vascular invasion of epiphyses begins (variable, depending on bone).
7. Endochondral ossification and periosteal bone reach metaphysis. Remodelling becomes prominent. Endochondral growth zone becomes orderly in arangement.
8. Epiphyseal ossification begins (before or after birth, depending on bone).

The steps outlined above will now be discussed in somewhat more detail, with specific reference to the humerus.

1. The first indication of an upper limb in man is found in embryos about 3 to 4 mm. in crown-rump length (almost 4 weeks after ovulation).[13] By 7 to 8 mm. (4½ weeks) cellular proliferation in the limb has resulted in a central, longitudinally arranged skeleto-muscular condensation. By 11 to 13 mm. (5 weeks) individual muscles are well differentiated and the more central part of the condensation is evident as the avascular skeletal blastema. Cartilage formation is beginning in this blastema, in a proximo-distal sequence. By 14 to 16 mm. (5½ weeks) the cartilages have the general shape of future bones, and by 22 to 24 mm. (6 weeks) the humerus resembles the adult in form and arrangement. The cartilage cells in the center of the shaft are now hypertrophied.

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2. In embryos of 25 to 27 mm. crown-rump length (6½ weeks) a thin layer of calcified bone matrix has been laid down between perichondrium and that central portion of the shaft containing the hypertrophied cartilage cells. By extending around the shaft it forms a ring or collar. This *periosteal bone* or *primary bone collar* is directly in contact with cartilage. The inner cells of what is now termed periosteum differentiate into osteoblasts, and alkaline phosphatase can be demonstrated in them. These cells line up in relation to bundles of collagen fibers and trabeculae begin to form, so that the primary collar gradually becomes multilayered.

The precise manner in which the matrix forms is unknown, although it seems likely that connective tissue cells are directly concerned. Like matrix or ground substance of connective tissue elsewhere, it contains complex compounds, including mucopolysaccharides, in varying degrees of polymerization.[6] Bloom and Bloom[2] and McLean and Bloom[10] have shown that, in rats, ground substance is calcified as soon as it is formed. The term osteoid refers to bone matrix which has not been calified, and as such is not generally present in rats. Whether or not osteoid is present in normal bone formation in man is unknown. Microscopic observations have to be interpreted in light of the fact that salts in early bone matrix are removed by many fixatives.

3. In the zone of hypertrophied cartilage, alkaline phosphatase appears in the cells and then in the intercellular material or matrix. Sometimes concurrently with the formation of the primary bone collar, but more often a little later, this matrix becomes calcified.

4. The time between the formation of the primary bone collar and calcification of cartilage matrix on the one hand, and the next phase, vascular invasion of the cartilage, is extremely variable, depending on the bone. In the case of the humerus and other large, long bones there is very little delay. Once the primary collar is well-established, it is penetrated at several points by vascular tissue and osteoclasts, derived from the periosteum. Cartilage matrix is removed and proliferating vessels with associated tissue extend toward both ends of the bone. The vascular invasion of the shaft marks the end of the embryonic period and usually occurs in embryos of 28 to 30 mm. crown-rump length (7 ovulation weeks).

In the case of other bones, such as metacarpals and phalanges, days or weeks may intervene between the formation of the primary bone collar and vascular invasion.

5. The invading tissue is mainly cellular, containing few if any fully formed blood vessels. Cartilage is rapidly removed by this proliferating tissue. Blood vessels and a circulation are then established. Some of the cells differentiate into osteoblasts while others are forerunners of blood forming cells. At a variable time after invasion, calcified bone matrix is laid down around bits of cartilage which are left, both in the region of the original entry and at the advancing zone of cartilage removal. This constitutes *endochondral ossification,* and in the case of the humerus is generally under way by the tenth menstrual week. By the twelfth week, endochondral ossification occupies more than half of the shaft.

6. By the ninth menstrual week vessels begin to penetrate the head of the humerus, preceding epiphyseal ossification by many months.[5] Similar invasion of the distal end usually begins by the twelfth or thirteenth week. This epiphyseal vascularization seems to be related to size of cartilage. It does not occur in smaller animals, such as rats, until actual ossification is imminent.

7. From the tenth week on, the rapid advance of endochondral ossification leaves behind a loose network of trabeculae which fuses with the multilayered periosteal shell. Each bony trabecula is formed around a bit of calcified cartilage matrix. Many of the trabeculae are removed almost as soon as they are formed, so that a short marrow cavity is formed. Those trabeculae which remain become progressively larger as more bone is laid down around them.

Periosteal ossification likewise extends towards the ends of the bones, by means of a continuing deposition of bone matrix adjacent to hypertrophied cartilage. New trabeculae are then added so that the shaft increases in thickness.

When the zone of endochondral ossification nears the epiphyses (by the end of the third month), it becomes much more orderly in appearance. The hypertrophied cartilage cells become arranged in longitudinal columns, separated by thin strips of calcified matrix. The columns are not, however, as long or as regular as those of lower animals commonly illustrated in textbooks. Osteogenic tissue and blood vessels invade the cell columns, leaving bars of calcified matrix. Bone

is then deposited on the surfaces of these bars. Many of the trabeculae thus formed are removed almost immediately, absorption occurring from their free ends.

The growth zone is responsible for the increase in length of the bone. The reconstruction which is necessary to maintain form as length increases becomes particularly prominent by the fourth to fifth months. While the precise functions of osteoclasts are still unknown, these cells are, however, commonly found where bone is being removed, and there seems little doubt that they are important in this process. Osteoclasts are seen in the tissue which first invades the shaft, and next to trabeculae which are being removed. By the end of the fourth month osteoclasts are found on the external surface of the metaphysis, and in the early part of the fifth month, many portions of this region show removal of periosteal bone. In other words, in this region of the humerus, bone is removed from the external surface and is laid down internally or endosteally. Were it not for these changes, an abnormally shaped bone would result. This type of reconstruction has been demonstrated experimentally by Leblond et al.[9]

The removal of bone from the external surface is most prominent in the region just below the level of the growth zone, to the extent that periosteal bone may be completely removed, exposing endochondral trabeculae and leaving an isolated periosteal ring or "l'encoche de Ranvier" around the level of the growth zone. A complete ring, however, is not common in human bones. Osteoclasts are numerous in the metaphyseal region, as Kölliker pointed out in some detail.[7]

One feature which is rarely explained satisfactorily in textbook accounts is the presence in the shaft or primitive compacta, of areas of calcified cartilage matrix, especially after the early part of the sixth month. If the shaft is formed from periosteum, and therefore by intramembranous ossification, how is the presence of cartilage explained? It is present because bone laid down on the inner surface of the metaphysis incorporates adjacent endochondral trabeculae. These, with their calcified cartilage cores, thus become part of the shaft.

The portion of the shaft which is uniform in width increases in diameter by surface accretion and endosteal removal. By this process those endochondral trabeculae which had become incorporated in compacta are eventually removed.

The reduction of metaphyseal width described above does not take place at each end of every bone, nor does it necessarily occur all the way around the end of a bone. The distal end of the humerus, for example, narrows in the anteroposterior direction but widens from epicondyle to epicondyle. Therefore on anterior and posterior surfaces, periosteal bone thickens above the growth zone. Removal of bone from the surface occurs only in medial and lateral epicondylar regions.

The shaft at birth is composed of a thick compacta, in which trabeculae are directed mainly longitudinally. The inner surface of the primitive compacta is irregular and trabeculated. Haversian systems (osteones) with lamellar arrangements characteristic of adult compacta are usually not present at birth.

8. The classical epiphyseal plate is not seen in the humerus until well after birth. Yet there are certain phases of epiphyseal growth which are indicated prenatally. As mentioned above, vessels begin to invade humeral epiphyses early in fetal life, preceding ossification by many months. The cartilage canals which are thus formed are filled with loose connective tissue, containing one or more arterioles, venules, capillaries and a few nerve fibers accompanying the blood vessels.

Ossification in the head of the humerus is usually indicated at or before term. Cartilage cells in the region of the future center enlarge and become vesicular. Matrix calcifies and vascular buds from adjacent cartilage canals then invade this area. They erode the matrix and deposit bone around cartilage remnants. Endochondral ossification then extends in all directions. After an epiphyseal center is well established, its growth zone forms in the deep part of the articular cartilage.

Conclusions

The above account is intended to illustrate certain features of the development of the humerus in man. The fundamental changes described are true also for the postnatal period. An understanding of these events is particularly important from the standpoint of bone disorders. If we consider cells, intercellular material (fibers and matrix), calcification and absorption, then specific pathological conditions may arise from involvement of each of these categories.[15] In scurvy, for example, there is failure of matrix formation. Vitamin A is extremely important for normal functioning of the endochondral growth zone. There is surprisingly

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Arthritis and Injury

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MAY ARTHRITIS be caused by injury? May pre-existing arthritis be aggravated by an accident? These two questions are often asked of physicians by patients and in legal actions in courts and industrial hearings. In these two latter instances it is surprising to hear how many physicians under oath answer a categorical "yes."

Mrs. X fell forward two steps while going down stairs in a large store. She landed on her hands and knees. Several months later symptoms of a long-standing degenerative arthritis of the cervical spine flared up. Mrs. X sued the store owner. In the trial her physician testified that the injury aggravated Mrs. X's arthritis. The jury awarded Mrs. X a substantial judgment.

The above actual case in which the writer was a witness for the defendant provides a glaring example of what many doctors evidently believe as to the relation between arthritis and injury. In the above case there was, in the first place, no proof whatever that the claimant had sustained any injury to her neck. She had an accident, but did not injure her cervical spine. This was proven by her own history, the physical findings and roentgen examination. Granting she did have an injury to her cervical spine, did it aggravate the arthritis she was known to have had for several years? With no immediate symptoms referable to her neck and none presenting until six months had passed, with no x-ray evidence of injury and with no x-ray evidence that the arthritis was any different than two years before, how could it then be asserted that Mrs. X had an injury to her neck or that an injury aggravated her arthritis? The answer to the second half of the question lies in the apparent widespread misunderstanding on the part of physicians as well as laymen as to how injury may affect a joint to produce arthritis and how it may aggravate a pre-existing arthritis.

It has long been recognized that degenerative arthritis is associated with age changes and with *chronic* traumatism. In an extensive literature it has repeatedly been pointed out that in degenerative arthritis "the joint tissues undergo slowly increasing deterioration and a characteristic adaptation to changed mechanical conditions."[1] No definite cause for the disease has ever been established. Perhaps the condition should not be thought of as a disease but merely as part of the aging process like wrinkles in the skin and greying hair. It is believed that wear and tear on the joints over a long period of time produces the changes in the joints which are recognized as degenerative arthritis. Consequently it is seen more frequently in the weight bearing joints and especially in those of obese individuals and in those who have done heavy manual labor through many years.

It is seen more frequently in weight bearing joints which have been functioning at a mechanical disadvantage as in genu valgus and varus. Correction of the valgus or varus strain at the knees by the simple expedient of an arch support in the shoes often completely eliminates pain at the knees. Many obese patients with painful weight bearing joints often get complete relief by nothing other than reduction of weight to normal. Both these observations tend to prove the theory that mechanical wear and tear and undue mechanical stresses play a prominent part in the development of degenerative arthritis and in the production of symptoms.

The whole problem of etiology can be reduced to a simple question of mechanics. A good carpenter would not hang a door without properly aligning the hinges, nor would he hang a 100-pound door with hinges designed for a 50-pound door. It should be obvious that improper alignment of hinges or use of a too heavy door would cause the hinges to wear out much faster than might be expected under proper normal conditions.

No authority has come forward with the claim that a single trauma to a joint, even severe, has anything to do with the production of degenerative arthritis or exacerbation of a pre-existing arthritis, unless the trauma produces some irregularity of the joint surfaces resulting in abnormal friction during motion or unless it produces a malalignment of the joint resulting in increased stress and strain and wear and tear during motion. While classical degenerative arthritis rarely occurs in young people, the orthopaedic surgeon often sees young adults with changes radiologically and pathologically identical with degenerative arthritis, particularly in the knees. Almost without exception these patients are overweight and/or have joints which are mechanically unsound due to congenital anomalies

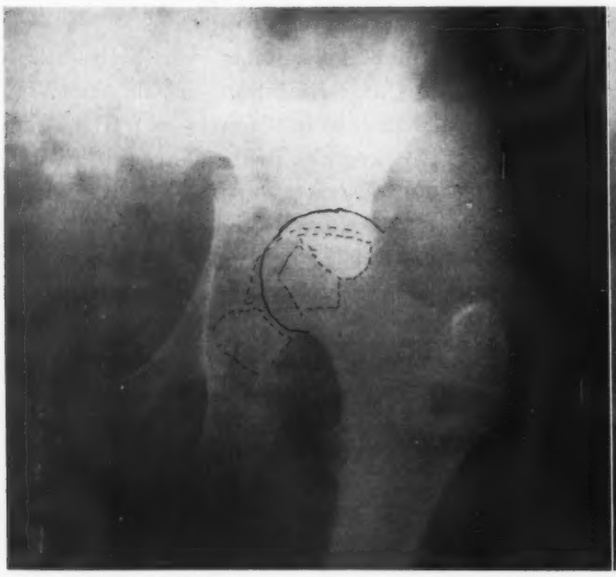

Fig. 1. Fracture dislocation of the hip.

Fig. 2. Same patient as in Figure 1, one year later; marked degenerative arthritis.

in development, changes which have occurred during the growth period or internal derangements due to injury.

Injury must have been severe enough to produce irregularity of the joint surfaces or a disturbance in alignment. In both instances there is usually no question as to how and when the initial trauma occurred. If there is some doubt as to when and how the injury occurred—its mechanics—it must be assumed that the trauma was insignificant and not of sufficient severity to produce the conditions necessary for the subsequent development of degenerative changes in the questionable joint.

How do we account for the fact that persons with symptomless degenerative arthritis of the spine often develop symptoms following minor falls or simple lifting strains? One should be extremely careful in interpreting these symptoms. In the first place, most of these individuals have had faulty postures for many years. Faulty spinal posture undoubtedly contributes to the development of degenerative arthritis of the spine. Once the arthritis has become established and as part of the pathological process, the ligaments lose their elasticity and hence may tear rather than stretch if put under undue sudden tension. The immediate symptoms are more severe and persist for a longer period than would be anticipated in a young person with a normal spine. The persistence of symptoms should therefore not necessarily be interpreted as an indication of an extension or exacerbation of the arthritic process. If the muscles and ligaments of the back are injured severely enough to produce considerable weakness of them for a long period, it is conceivable that this weakness might permit further increase in an already poor posture and thus contribute to an increase in spinal arthritis. It is difficult to imagine how a minor lifting strain could produce such weakness. One must therefore conclude that any apparent increase in arthritis is purely coincidental and unrelated to the alleged injury.

The relationship between injury and degenerative arthritis is well recognized in certain instances. A classical example is dislocation of the hip associated with fracture of the acetabulum. Without open reduction (not commonly employed) it is almost impossible to secure accurate reposition of acetabular fragments. When union takes place, the articular surface of the acetabulum is irregular. The head of the femur cannot move in the socket and bear the weight of the body without being subjected to abnormal friction. Furthermore, this injury is invariably associated with some damage to the blood supply to the femoral head and its articular cartilage. This results in degenerative changes in the femoral head, in addition to those of the acetabulum. The combination is a bad one and usually results in severe degenerative arthritis of the hip joint.

Fractures of the tibial plateaus not properly reduced, resulting in irregular and rough articular surfaces or in varus or valgus of the knee, are

Fig. 3. Fracture dislocation of the ankle; appearance five months after injury. Chief complaint was deformity. Fibrous union of fractures was present and patient was bearing full weight. Degenerative arthritis was inevitable without surgical correction of the deformity.

Fig. 4. Same patient as in Figure 3, one year after operation. Note correct alignment of joint and preservation of joint space. Patient was symptom free.

notoriously prone to be followed by degenerative arthritis.

Fractures of the calcaneum so frequently result in such incongruity of the subastragaloid joint and subsequent development of degenerative arthritis in that joint that many orthopedists routinely arthrodese the joint immediately.

In the above three instances there is no doubt as to the "when" and "how" of the injury. It is sudden and severe. The difficulty in determining the causal relationship between injury and arthritis occurs in those instances in which the alleged injury is indefinite and in which symptoms usually develop months or even years later.

The lack of regenerative power in articular cartilage is well recognized. It is likewise recognized that even slight trauma to articular cartilage may produce irreversible damage and chronic degenerative changes which gradually increase in severity with function. On the other hand, and in absolute fairness, one should not jump to the conclusion that every joint injury is responsible for a degenerative arthritis which may develop later. One must first differentiate between accident and injury. The two terms should not be used synonymously. The exact mechanics of the accident must be determined and analyzed before it can be assumed that it caused sufficient damage to joint structures to produce arthritis. The injury must have been of sufficient severity to produce (1) permanent impairment of the circulation to subchondral bone, (2) irregularity of articular surfaces, (3) malalignment of the joint or (4) a combination of these three factors.

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HEALTH COSTS

Medical care is costing the American people 12.4 billion dollars a year, according to an article in the December 24, 1954, issue of *U. S. News and World Report.* Payments by individuals and companies, excluding workmen's compensation and other payments required by law, came to $3 billion for hospitalization, $3 billion for physicians' and surgeons' fees, $1 billion for dentists' fees, $0.6 billion for nursing and other professional service, $2.2 billion for medicines and appliances, and $2.6 billion for health insurance and pre-payment plan premiums. Persons covered by health insurance and prepayment plans received $2.1 billion in benefits, leaving a net bill of $10.3 billion. These figures are based on the latest study of the Social Security Administration, and were brought up to date through estimates by the Economic Unit of *U. S. News and World Report.*

Rheumatology, 1954
A Therapeutic Survey

With Review of Cases Treated with Procaine Hydrochloride

By Ezra Lipkin, M.D.
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A REALISTIC appraisal of the therapeutic agents that have been recently added to the field of rheumatology leads inevitably to the conclusion that they have not lived up to expectation. The urgency of the problem assumes greater importance when we consider that the rheumatic diseases rank first in incidence and second only to nervous and mental disorders as causes of disability. It was estimated that in the United States more than 300,000 persons are made unemployable by rheumatic diseases annually, and more than 147,000 are rheumatic invalids, and that these diseases accounted for more than 92 million days lost from work per year, representing an annual economic loss of a half-billion dollars.

Classification

The 1953 "Primer on Arthritis" divides the more common rheumatic diseases into eight important groups: (1) arthritis due to known bacterial agents, (2) the arthritis of rheumatic fever, (3) rheumatoid arthritis, (4) the "collagen diseases," (5) degenerative joint disease, (6) arthritis due to direct trauma, (7) arthritis due to gout, and (8) the non-articular forms of rheumatism.

We shall not go into a detailed discussion of the various groups. We shall dwell primarily on the group which assumes major importance in causing serious disability, namely, rheumatoid arthritis. Further on, we shall review a few representative cases of the non-articular form of rheumatism, which we treated successfully with injections of aqueous procaine hydrochloride.

Rheumatoid arthritis is not a disease which is treated uniformly by all rheumatologists. The fact that it is treated by some with steroid compounds, by others with either butazolidin, gold, salicylates, atabrin, or by a well-balanced conservative regime, bespeaks the complexity of the subject and the variability of response by different patients. Coupled with the uncertainity of a "cure" is the danger of complications which sometimes arise in the course of treatment. It takes a courageous physician to face a complication which has made it necessary to discontinue an otherwise effective medication. The patient must be made aware of the risks involved, and only upon his willingness to face a possible danger can a physician embark upon the use of some of the newer forms of therapy, including the "miracle drugs."

Types of Therapy

Cortisone.—The ultimate value of cortisone in the treatment of rheumatoid arthritis has not yet been fully determined. Favorable results with both short and long term cortisone administration have been reported by Hench and colleagues,[11] McEwen and Bunim,[13] Boland and Headley.[3] However, in the majority of cases, relapse began within two to fourteen days following cessation of therapy. The limitations of cortisone and the dangers in its administration are listed as follows:

1. The benefits derived from the hormones are temporary and suppressive only, not curative.
2. They must be administered more or less continuously for an indefinite period of time, if improvement is to be sustained.
3. The hormones, in addition to their antirheumatic action, produce manifold physiologic responses in various organs and tissues, and these may become clinically manifest as adverse hormonal complications.
4. Certain co-existing pathologic conditions may be aggravated by the hormones and serve as relative or absolute contraindications to their use.
5. Long continued use of the hormones results in histologic and functional changes in the adrenal cortices and the anterior pituitary gland.
6. Optimal methods of administration and patient management have not yet been established.[10]

Similarly, intra-articular injections of *hydrocortone,* as reported by Duff and associates,[4] did not produce universal improvement, although in 19 per cent the periods of remission upon discontinuance of therapy persisted for four to twelve months. In 31 per cent of the cases, this treat-

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ment was discontinued because partial initial benefit could not be further improved.

Butazolidin (phenylbutazone).—Based upon a series of 800 cases treated with butazolidin, Kuzell and associates[12] conclude as follows: "The most striking clinical improvement was observed in acute and chronic gout. Among the other diseases which improved were ankylosing spondylitis, psoriasis with arthritis, painful shoulder, rheumatoid arthritis and osteoarthritis, in that order. The most frequent toxic manifestations were gastrointestinal and those related to fluid retention. On cessation of medication in chronic rheumatic disorders, where a variable degree of improvement was observed, symptoms promptly returned in almost all instances."

Chrysotherapy.—Freyberg[8] compiled statistics on therapeutic results in 4,086 cases which appeared in the European and American literature between 1935 and 1948: 61 per cent were reported as arrested or greatly improved. Ragan and Tyson[15] studied 142 cases of rheumatoid arthritis treated with gold over a three-year period and summarized their results as follows: "Of patients receiving full treatment with one or two courses, 10 to 20 per cent can be expected to show no improvement, and 40 to 60 per cent to show striking improvement; but 80 to 90 per cent of these can be expected to relapse within five years, with 80 per cent of these again being benefited by gold."

Formerly the popular treatment schedule was to give one, two or several courses of gold therapy with rest intervals of six weeks to six months between courses. The modern trend has been to administer a single course, followed thereafter by "maintenance doses" consisting of 50 mg. every two to four weeks for an indefinite period. The purpose of the maintenance dose plan is to reduce the incidence of relapses.

Conclusions on Chrysotherapy.—"Because of the high percentage of toxic reactions attending their use, gold compounds are far from a satisfactory therapeutic agent."[17] Several authors believe that the case for gold therapy is unproved as a palliative or adjuvant measure, and that the hazards attending it should furnish a decisive argument against its general use.[2] Advocates of gold therapy admit that it should not be relied on exclusively, and that it should be used in conjunction with general measures (rest, salicylates, nutritious diet, physical therapy, et cetera). But, in view of the serious potentialities of rheumatoid arthritis, many agree with Hench[9] that chrysotherapy, although still on trial, is justified whenever rheumatoid arthritis has lasted more than a few months and shows evidence of being progressive, provided that the patient understands and is willing to share the risks involved.

Atabrin (quinacrine, mepacrine).—Our first introduction to atabrin as a therapeutic agent in rheumatoid arthritis came last August during a discussion period at a meeting of the Israel Medical Association, which we had the pleasure to address. It had been used by U. Adar, of Tel Aviv, and others, with apparently satisfactory results. In a personal communication dated May 4, 1954, Dr. Adar submitted the following report:

". . . The idea of using atabrin struck me when I read in the *Lancet* the well-known article concerning the use of atabrin in lupus erythematosus disseminatus.

"About two years ago, I started my experiments, and a year later published my first results in the *Harefuah*.

"Hitherto I have thus treated forty patients, in twelve of whom the pains and the swellings disappeared, and the blood sedimentations rate became normal. Four improved, and the others did not react.

"My patients received 0.4 gm. atabrin daily, consecutively for six weeks. Two patients who had a relapse were successfully treated again in the same way.

"Apart from two instances of mild hepatitis, I have not noticed any ill-effects or complications arising from the use of atabrin."

A search of the literature reveals a rather meager supply of information on the subject. Freedman and Bach[7] reviewed twenty-three cases of rheumatoid arthritis treated with atabrin, in which all but one were very much improved. The longest period of observation was eight months, the shortest six weeks. "As their skin became yellow, their pain gradually eased and they needed less analgesics. Soft tissue swelling subsided, and movement became free and more vigorous. Joints showing contracture or ankylosis, or with secondary degenerative disease, lost all signs of active inflammation. Power of grip and speed of walking gradually improved. Six to ten weeks of

treatment were necessary before all signs of joint inflammation were lost."

Engeset and Hanssen[6] report eleven cases of rheumatoid arthritis treated with atabrin. The longest period of observation was five months, the shortest six weeks. "All of the patients declared that their pain gradually eased, and in five there is already definite objective improvement. Treatment with mepacrine is not followed by eosinopenia or increased excretion of 17-ketosteroids; nor is the erythrocyte sedimentation rate influenced in our experience." The authors agree with the findings of Freedman and Bach regarding dosage and length of treatment.

Long-Term Conservative Treatment in Rheumatoid Arthritis

The quest of a sovereign remedy that would have all the advantages and none of the disadvantages connected with some of the newer drugs in the field of rheumatology has thus far been fruitless.

"Rheumatoid arthritis remains an incurable disease. It should now be recognized that treatment with gold, cortisone, or phenylbutazone has not been shown to alter the natural course of the disease in a significant manner.' A number of investigators, notably Short tnd Bauer and Ragan, have, therefore, undertaken an investigation of long-term conservative treatment in rheumatoid arthritis, including bed rest, exercises, physical therapy, a well-balanced diet and analgesics, and found that approximately 50 per cent had improved, and in the remaining 50 per cent the end results were poor. The results of the British investigators, headed by Duthie, showed a larger percentage of improvement and indicate that 'the activity of the disease can often be significantly reduced by conservative measures applied in the hospital, and that functional capacity can continue to improve, if medical and social after-care are adequate.' "

Non-Articular Forms of Rheumatism

We now come to the consideration of a group of miscellaneous rheumatic diseases, which include such clinical entities as bursitis, periarticular arthritis, fibrositis, neuritis, sacroiliac sprain, peritendinitis, et cetera, in which there is involvement of the fibrous, muscular, ligamentous and nerve structures, rather than the joints. While the etiologic factor in these conditions might vary, embracing such diverse causes as acute and chronic trauma, exposure to cold and dampness, infection and metabolic changes, their response to procaine is more than just a temporary relief of pain, as might be inferred from the type of medication, as it brings about complete relief of the condition through the interruption of a chain of causes and effects, which begins with pain, spasm and limitation in motion and ends in disability, which, if unrelieved, may become permanent.

By way of illustration, we shall present a few representatives cases in which treatment was given at our office, and let these speak for themselves.

Case 1. Brachial neuritis.—Mrs. E. M., aged fifty-two, was first seen at the office on February 11, 1954, complaining of pain in the right arm and limitation in abduction and external rotation. She was given three brachial blocks, at the end of which her condition improved sufficiently to discontinue treatment for about six weeks. When the pain returned, she was hospitalized for two weeks and given daily injections of procaine. While she was receiving additional treatment consisting of thiamine, tolserol, salicylates and local heat applications, nothing gave her as much positive relief as the brachial blocks, to which she looked forward eagerly. At the end of two weeks, following her discharge from the hospital, she has continued her injections of procaine at semi-weekly intervals which have now been extended to once a week or longer. A more detailed history, at this point, from the patient's point of view, would not be amiss:

"Although I was unaware of it," she writes, "my condition started about two years ago. Distressing symptoms first appeared in the upper muscles of my right arm. These I attributed to the air conditioning at the place at which I worked, as a 'cold in my system.' Frequently I felt I was being a hypochondriac and just imagined my discomfort.

"When my arm was bothering me, I usually applied various liniments, which did nothing to relieve it. On the rare occasion when I did mention it to my family doctor, he suggested that I probably had a 'cold'; or that he, too, had aches and that everyone gets more of them as he gets older.

"Last year the condition seemed to be getting progressively worse, and I could no longer delude myself that I merely had a 'cold' in my arm, so I went to the hospital and consulted an orthopedic specialist. No real diagnosis was given, but diathermy treatments plus cortisone and tolserol were prescribed, with no appreciable difference in my condition resulting.

"In December, 1953, I was hospitalized for colitis. Meanwhile, my arm became progressively worse. My doctor, an ulcer specialist, told me that I had neuritis but that he knew of nothing other than heat treatments plus vitamin B_1 in large quantities.

"The pain in my arm which had been more or less localized now traveled up into my shoulder, under my armpit and down to my fingertips. As the pain became more intense and constant, my hand and arm became swollen, my arm was discolored with a blotchy mottled

effect, and I could not raise it. As the pain increased, so did the discoloration of my arm and the swelling in my hand and arm. This happened in spite of the fact that I had followed different doctors' advice —soaking with epsom salts, diathermy, heating pad applications, et cetera. I was forced to give up my work, and was at my wits' end, when I heard of the procaine injection treatment for neuritis. I received a few of these treatments early in February and was helped a great deal. Because I felt somewhat better, I decided I did not need any more treatments, because I still had the idea in my mind that my condition was not physiological but psychological. However, the pain returned, and I was hospitalized for a period of two weeks, during which I was given brachial blocks, proper diet and bed rest, and my arm began to show marked improvement. The swelling and discoloration below my elbow began to disappear. Through continued treatment, my period of relief now numbers days, whereas at first it numbered hours. I can now use my arm with limitation, whereas before I could not use it at all."

Case 2. Sacroiliac sprain with referred sciatic neuralgia.—Mrs. B. K., aged thirty-one, consulted us on November 8, 1952, for pain in the lower back and right leg, of two years duration, at first intermittently, but for the past eight weeks continuously. There was a possible traumatic onset, occasioned by washing the kitchen walls. The pain was aggravated by coughing and sneezing. There was no numbness in the leg. The pain was so severe that the patient had to stay in bed most of the time. Examination revealed tenderness on pressure over the right sacroiliac joint. Straight leg raising was painful. The Lasegue sign was positive.

While the patient was not hospitalized for myelography to rule out a possible slipped disk, she was treated empirically at the office, with procaine injections, first into the ligaments adjoining the sacroiliac articulation, and later into the sciatic nerve. Altogether, the patient received four injections of 1 per cent aqueous procaine (15 cc. each) into the sacroiliac area and 20 cc. into the sciatic nerve. The patient made a complete recovery. The pain has not returned since November 24, 1952—a period of over two years.

Case 3. Chronic sacroiliac sprain.—Mrs. H. G., aged thirty-one, complained of lower backache of eight years' duration, following the birth of a child, delivered by forceps. She also gave a history of having lifted a heavy piece of lumber thirteen years ago. She was hospitalized, placed on a bed with boards under the mattress; the back was strapped with adhesive tape, an infra-red light was applied, and analgesics given. However, after a week of the above treatment, the patient did not improve and wished to go home. All laboratory data, including x-rays, were negative.

When several days later the patient returned to the office with the original complaint, the back was reexamined and acute tenderness elicited in the left sacroiliac region. The area was then injected with 15 cc. of 1 per cent aqueous procaine, and the pain disappeared almost immediately. She was re-injected at weekly intervals for a total of three weeks, and has now been free from pain since December 19, 1953—a total of fifteen months. A sacroiliac support was recommended to prevent recurrence of the condition.

Case 4. Sacroiliac sprain, with radiation down left leg.—Mrs. A. C., aged forty-seven, came to our office, complaining of "kidney trouble." There was no frequency or burning on urination, there was no edema of the ankles, and the urine contained no albumin or pus. The reason for the complaint was pain in the left "kidney region." Examination of the spine revealed marked tenderness over the left sacroiliac spine, and 20 cc. of 1 per cent procaine was injected in the sacroiliac area, followed by a similar amount one week later. The pain disappeared promptly, and has not recurred since March 9, 1954—a period of one year. This case illustrates the value of differential diagnosis.

Case 5. Suspected protrusion of intervertebral disk.—Mrs. M. M., aged thirty-seven, while stooping, sneezed violently and developed a sudden excruciatingly sharp pain in the lower back. She was unable to sit or lie down and was still in a kneeling position with her head resting on the bed when we arrived in response to an urgent call. There was acute tenderness in both the lumbosacral and sacroiliac joints. Injections of 20 cc. of 1 per cent procaine were given in three tender areas, and the injections repeated in three and seven days, respectively, the last injection being given in the sacroiliac region where the pain still persisted. Following the third injection, the pain disappeared, and has not returned since January 9, 1953—a period of about two years. The patient was advised to wear a Mayo sacroiliac belt to prevent recurrence of the pain. Since the patient was completely relieved, no further examinations were indicated. It is possible that the protrusion, if any, automatically receded and no longer caused pressure on the lumbo-sacral plexus.

Conclusions on Procaine

Procaine injection treatment represents a simple method for relieving acute and chronic conditions affecting nervous, muscular and ligamentous structures within the framework of rheumatic diseases. It is more amenable in the treatment of nonarticular rheumatism than in either rheumatoid or osteoarthritis. While tender spots in rheumatic joints have been infiltrated, the response, in general, has not been as satisfactory as the injection of soft tissues, such as nerves, muscles and ligaments. Though the procedure is simple, one must nevertheless have some familiarity with the anatomic structures involved, especially for the infiltration of the brachial plexus. The site of injection must be accurately determined, as the success of the treatment will be dependent upon infiltration of the nerve proper, rather than the

(Continued on Page 316)

Plasma Fibrinogen Level

I. Mechanism, Observations and Interpretations

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INTEREST in the amount of fibrinogen in the blood plasma as an index of disease activity received great impetus from the development of reliable clinical laboratory methods for its quantitative estimation by Ratnoff and Menzie[10] in 1951. Since that time plasma fibrinogen determinations can be made routinely in any clinical laboratory, but time enough has not yet elapsed to evaluate properly the significance of fluctuations in the plasma fibrinogen and their relationship to various clinical conditions. Although quantitative methods suitable for use in the average clinical laboratory have only recently been made available, more cumbersome but reliable methods have been in use for a long time. Regardless of that, very little has appeared in the literature as to the value of the plasma fibrinogen level as a diagnostic and prognostic aid in clinical medicine. Of course, it has been known for a long time that an increase in the plasma fibrinogen occurs in pregnancy, infections, malignancy, and the collagen diseases, but the literature reveals very little as to why it occurs.

In good health the fibrinogen content of the blood plasma remains fairly constant, being stabilized somewhere between 250 and 350 mg. per cent, depending upon the individual. Repeated determinations made upon the blood of a normal person shows that the fibrinogen content varies but little, unless a change in the state of health takes place.

In disease the plasma fibrinogen level is not stabilized and may fluctuate rather rapidly depending upon the pathologic physiology associated with it. In more than 3,000 determinations made on the blood of patients suffering with a wide variety of conditions, from which these observations and interpretations were made, the plasma fibrinogen level was found to vary all the way from zero in abruptio placenta to 2,200 mg. per cent in active rheumatoid arthritis associated with liver disease.

In disease as in health the amount of fibrinogen circulating in the blood is regulated by homeostasis.[3] The fibrinogen is an extremely important part of the coagulation mechanism, which in a biological sense is essential to life itself. Nature regulates the coagulation mechanism to a fine degree by a complex system of very delicate balances and counterbalances. One of the major balances in this complex system of coagulation homeostasis is the reciprocal relationship established between the amount of fibrinogen in the plasma and the activity of the thromboplastin mechanism. In the process of blood coagulation the fibrinogen is converted to fibrin by the action of the thromboplastin mechanism and a delicate reciprocal balance must be maintained between the two in order to maintain just the right degree of coagulability in the blood at all times. When the ability of the thromboplastin mechanism to convert fibrinogen to fibrin is reduced by drugs or disease, biological homeostasis increases the amount of fibrinogen as a compensatory measure in order to maintain normal coagulability and preserve life itself.

Factors Which Decrease the Plasma Fibrinogen Level

1. Congenital Afibrinogenemia.—Congenital afibrinogenemia, first described by Pinninger and Prunty,[9] fortunately is a very rare condition. It is thought by some that this condition is a reversion to an earlier stage in our phylogenetic development, in which the fibrin clotting mechanism had not yet appeared. It is suggested that the blood platelets may be prototypes of the earlier amebocytes, which, on exposure to a foreign surface, clump and coalesce into a compact, elastic and even retractile mass similar to the fibrin clot in higher animals.

2. Congenital Hypofibrinogenemia.—In congenital hypofibrinogenemia the fibrin clotting mechanism is intact, but functioning at a lower level than normal. Homeostatic functions are in perfect balance and no clotting defect exists. The milder forms may go unnoticed while the severe forms are found in infants and children physically below par with no particular diagnosis in many cases. In others, recurrent and fleeting pneumonitis, vague abdominal discomfort, general malaise, secondary

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anemia, pallor, failure to gain weight, anorexia, and increased neuromuscular irritability chiefly at night, should arouse suspicion and indicate a fibrinogen determination.

3. *Abruptio Placenta.*—The average normal plasma fibrinogen level of nonpregnant women is stated by Stevenson et al[11] to be 260 mg. per cent while the average of normal pregnancy at term to be 480 mg. per cent. In pre-eclamptic women the average is increased to 510 mg. per cent while in eclampsia, according to Dieckmann,[1] the average plasma fibrinogen level reaches 660 mg. per cent.

With premature separation of the placenta, thromboplastin from the abruption site gains entrance into the open sinusoids and into the arterial circulation where it brings about a conversion of the fibrinogen to fibrin. Massive thrombosis does not occur, but instead there is an intimal fibrin coating of the entire arterial tree. The plasma fibrinogen level is either partially or totally reduced to zero.

4. *Thromboplastin.* — The administration of homologous thromboplastin* does not appreciably reduce the normal plasma fibrinogen level but it does reduce the plasma fibrinogen level that is pathologically high.[6,8] In contrast to the intravascular action of thromboplastin on fibrinogen in abruptio placenta, the reducing effect of oral thromboplastin on hyperfibrinogenemia is indirect by way of the homeostatic mechanism which controls blood coagulation. Homeostasis increases the plasma fibrinogen when the thromboplastin mechanism is weakened by drugs or by disease. Thromboplastin therapy acts to correct the imbalance. By supporting the thromboplastin mechanism with additional thromboplastin, the fibrinogen level drops accordingly.

5. *Trypsin.*—This enzyme has a marked tendency to reduce hyperfibrinogenemia[6] when first given for a short period of time depending upon the dosage. With the larger dosage the plasma fibrinogen level drops at first and then markedly increases if trypsin treatment is continued. The larger dosage by injection (but not orally) is especially prone to cause a rise in the fibrinogen after an initial period of reduction. The concurrent administration of thromboplastin prevents the delayed rise in the fibrinogen from trypsin treatment. These observations tend to agree with Ferguson, Travis and Gerheim[2] who found that trypsin activated and potentiated thromboplastin. The plasma fibrinogen level is controlled by homeostasis and regulated inversely proportional to the strength in the thromboplastin mechanism. Potentiation of the weakened thromboplastin mechanism with trypsin reduces the hyperfibrinogenemia by way of improving the homeostatic balance for the time being. When the thromboplastin has been potentiated to exhaustion, the fibrinogen rises sharply to compensate for the lack of adequate thromboplastin in the coagulation mechanism. Adequate thromboplastin must be present to prevent untoward results with trypsin therapy.

6. *Protamine Sulfate.*—Protamine sulfate when used to neutralize metabolic toxins (i.e., heparinoid toxin) reduces hyperfibrinogenemia.[5,7] When used in larger amounts, the excess protamine sulfate neutralizes thromboplastin and thereby causes the plasma fibrinogen level to rise.

7. *Heparin.*—When heparin is used as replacement therapy in patients with heparin deficiency, its administration causes a reduction in hyperfibrinogenemia.[5,6] Heparin, just as with trypsin and protamine sulfate, when used in excess will exhaust the thromboplastin and cause a compensatory rise in the plasma fibrinogen level.

Factors Which Increase the Plasma Fibrinogen Level

1. *Pregnancy.*—The physiologic withdrawal of thromboplastin from the maternal organism in pregnancy reduces the power of the thromboplastin mechanism to convert fibrinogen to fibrin, and in order to maintain normal coagulability in the blood, homeostasis increases the fibrinogen to compensate for the loss of thromboplastin. The placenta is extremely rich in thromboplastin, but it is not synthesized there. It is mobilized in the maternal organism and appears to be transported to the placental site by way of the blood platelets. Observations made on the platelets of pregnant women before they have missed a menstrual period show a sharp drop in the platelet count occurring simultaneously with morning sickness. The platelet count recovers to near normal within a few days, but the plasma fibrinogen level increases.

*As used in these studies the hexose polysaccharide sulfate esters as "Polyheparin" and thromboplastin as "Thromboplex" were supplied by Drug Industries Company, Detroit.

The administration of oral thromboplastin in adequate amounts stops the vomiting but does not reduce the increased fibrinogen level until late in pregnancy.

2. *Antithromboplastin.*—Substances which inactivate thromboplastin cause the fibrinogen level to rise. The two most commonly recognized therapeutic antithromboplastins are heparin[5] and protamine sulfate.[7] However, heparin-like substances with anticoagulant action by virtue of their antithromboplastin activity are widespread in the plant world, but these substances are all too toxic for internal use.

3. *Drugs.*—Bishydroxycoumarin[4] and its homologues in the coumarin group weaken the thromboplastin mechanism indirectly by inactivating vitamin K which is necessary for the synthesis of prothrombin. Simultaneously with the administration of these drugs hypoprothrombinemia develops. The thromboplastin mechanism is thereby weakened and the plasma fibrinogen increases as a compensatory measure.

4. *Metabolic Toxins.*—These are biological substances formed within the body that have antithromboplastin activity. Heparinoid toxin[5] at the present time is the only demonstrable metabolic poison which effects an increase in the plasma fibrinogen level, but there is no doubt that in due time others will be discovered. Heparinoid toxin appears to have its origin in a congenital defect in the biosynthesis of heparins, in which the presence of heparinoid toxin is associated with a heparin deficiency. While the presence of heparinoid toxin has not been found without indications of a coexistent heparin deficiency, indications of a heparin insufficiency have been observed without the presence of heparinoid toxin. This heparin-like substance is an abnormal heparin which is not used in the body metabolism and exerts its toxic effect by virtue of its antithromboplastin activity. It is the inactivation of thromboplastin by this heparin-like substance that causes a compensatory rise in the plasma fibrinogen level.

Interpretation of the Plasma Fibrinogen Level in Disease

In order to be of value in clinical medicine the plasma fibrinogen level must be interpreted in the light of its place in physiologic homeostasis and also in the light of the disease condition associated with it. The amount of fibrinogen in the blood is controlled by homeostasis and regulated inversely proportional to the activity of the thromboplastin mechanism. One of the major mechanisms set up by nature to maintain normal coagulability in the blood is the balance between fibrinogen and the ability of the thromboplastin mechanism to convert it to fibrin. When either disease or drugs interfere with the thromboplastin mechanism, the imbalance thus created is immediately reflected by compensatory changes in the fibrinogen. When these changes are quantitatively determined and interpreted in the light of our present concepts of the mechanisms involved and in the light of our knowledge of the particular disease associated with it, the plasma fibrinogen level becomes not only a good diagnostic and prognostic aid but also an important guide for directing therapeutic measures. In all instances the plasma fibrinogen level must be interpreted in relation to the clinical conditions associated with it.

For practical purposes the plasma fibrinogen levels as they are found in disease may be divided into four groups, namely: normal, subnormal, false normal and high.

Normal.—Many diseases do not affect the amount of fibrinogen in the blood because these diseases do not disturb the efficiency of the thromboplastin mechanism in any way. The normal fibrinogen level is schematically illustrated in Figure 1 *(above)*. The body reservoirs of thromboplastin and polyheparin (hexose polysaccharide sulfate esters or heparin spectrum) are physiologically balanced with fibrinogen which is at the average normal level of 300 mg. per cent. These balances revolve around and aid in maintaining a normal clotting time in the blood.

Subnormal.—With the exception of abruptio placenta all subnormal plasma fibrinogen levels may be classified as primarily congenital in type. There is no known disease or therapeutic measure which will reduce a true normal plasma fibrinogen to subnormal levels. A true normal fibrinogen level is protected by a normal homeostatic mechanism which does not permit hyperthromboplastinemia to develop. False normal fibrinogen levels are readily reduced by protamine sulfate to their rightful subnormal levels, as discussed later. The subnormal plasma fibrinogen level is schematically repre-

sented in Figure 1 *(below)*, with thromboplastin, polyheparin and fibrinogen all in perfect functional balance but operating at a low level. Homeostasis maintains normal coagulability in the blood

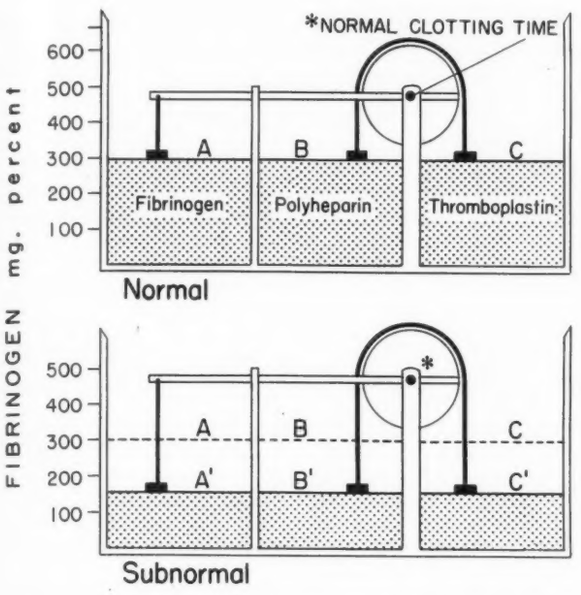

Fig. 1. Schematic illustration of the normal plasma fibrinogen level *(above)* in the homeostasis of normal blood coagulation. The body reservoirs of thromboplastin and polyheparin (hexose polysaccharide sulfate esters) (heparin spectrum) are balanced with each other and these are balanced with fibrinogen at the average normal level of approximately 300 mg. per cent. The entire homeostatic mechanism revolves around the normal clotting time as a physiologic constant.

The subnormal plasma fibrinogen level *(below)* functions in perfect homeostatic balance with thromboplastin and polyheparin. All three are equally balanced at a lower level. This illustrates the homeostatic balance in congenital hypofibrinogenemia.

of these patients, and this is schematically illustrated by the coagulation balances and counterbalances operating around the normal clotting time as a fulcrum.

From the large number of children and young adults having a subnormal plasma fibrinogen level, congenital hypofibrinogenemia appears to be a very common condition. It appears to be the basis upon which the false normal and the high plasma fibrinogen levels are founded.

False Normal.—Observations indicate that congenital hypofibrinogenemia is associated with a low or insufficient production of hexose polysaccharide sulfate esters. Because of the inability of the body to meet the demand for these substances, stimulated by disease and the stress and strain of living, the metabolic processes synthesize a similar substance (heparinoid toxin) which is not physiologic but toxic in that it accumulates in the body and inactivates thromboplastin. The inactivation of thromboplastin by heparinoid toxin causes a com-

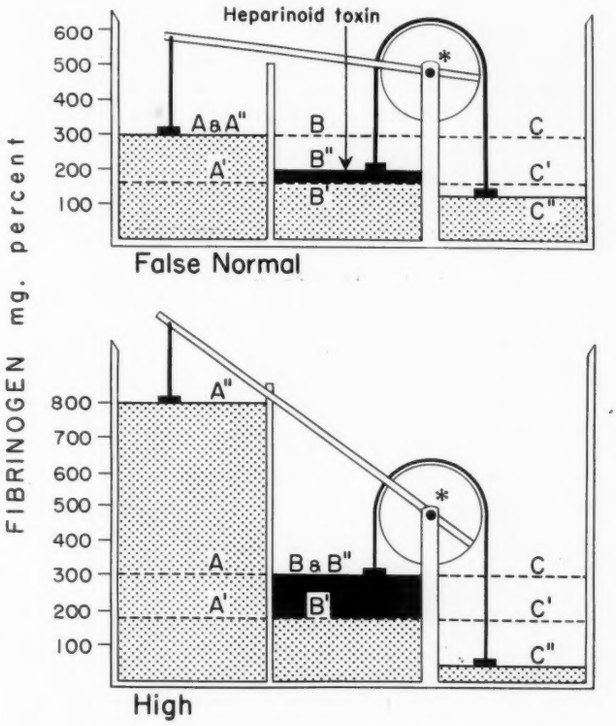

Fig. 2. Schematic illustration of the false normal plasma fibrinogen level *(above)* which is essentially congenital hypofibrinogenemia with a small amount of heparinoid toxin. The heparinoid toxin neutralizes a small amount of thromboplastin and this causes a compensatory rise in the fibrinogen. The rise in fibrinogen is necessary to maintain normal coagulability, i.e., normal clotting time in the blood. The small rise in fibrinogen is just sufficient to elevate the original low fibrinogen up to the normal level. (By removing the heparinoid toxin with protamine sulfate the fibrinogen drops to its original subnormal level.)

The high fibrinogen level *(below)* is simply the presence of a larger amount of heparinoid toxin which causes a greater compensatory rise in the fibrinogen. Homeostasis functions to maintain a normal clotting time regardless of the magnitude of the imbalance.

pensatory rise in the plasma fibrinogen. The production of just a small amount of heparinoid toxin may cause the plasma fibrinogen level to rise just enough to bring it up into the normal range. This mechanism is schematically illustrated in Figure 2 *(above)*.

The false normal fibrinogen level is easily detected by the administration of 20 to 30 mg. of protamine sulfate daily for ten to twelve days with a plasma fibrinogen determination every three days. This small amount of protamine sulfate is not enough to appreciably affect the true normal

level but is sufficient to neutralize the accumulated heparinoid toxin which allows the thromboplastin to recover and the plasma fibrinogen to drop to its rightful subnormal level.

High.—The presence of a larger amount of heparinoid toxin depletes the thromboplastin reservoir and homeostasis increases the plasma fibrinogen to compensate for the loss of thromboplastin. This is schematically illustrated in Figure 2. Regardless of the height of the plasma fibrinogen level, homeostasis maintains a normal clotting time.

Summary

The plasma fibrinogen level is controlled by physiologic homeostasis, and regulated inversely proportional to the ability of the thromboplastin mechanism to convert fibrinogen to fibrin. Factors which weaken the thromboplastin mechanism cause the plasma fibrinogen to rise, while factors which strengthen the thromboplastin mechanism bring about a reduction in hyperfibrinogenemia.

Congenital hypofibrinogenemia is a common condition and appears to be the basis upon which compensatory hyperfibrinogenemia later develops. An insufficiency in the hexose polysaccharide sulfate esters (polyheparin) appears to be associated with congenital hypofibrinogenemia, and probably is a manifestation of the same metabolic defect. Unable to meet the physiologic demand for these substances created by disease and the stress and strain of living, the body forms a similar substance, heparinoid toxin, as a substitute which accumulates in the body and depletes the thromboplastin mechanism. The homeostatic imbalance thus created in the coagulation mechanism is immediately reflected by a compensatory increase in the plasma fibrinogen level.

The plasma fibrinogen level interpreted in relation to the clinical condition associated with it, and in the light of its place in homeostasis, is an important aid in diagnosis and prognosis as well as an excellent guide in therapy.

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Rehabilitation of the Chronic Arthritic Hand

By Max Karl Newman, M.D.,
A. S. Goldstein, M.D.
P. Wall, R.P.T., and
H. B. Jewett, O.T.R.
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IN THE FIELD of physical medicine and rehabilitation, the trend of activity has been toward the total concept of management of chronic incapacity. Hence, chronic arthritis, as a major disease syndrome, along with neuromuscular and other musculoskeletal disease, warrants tremendous scientific interest. Most important in the therapeutic trend of this disease has been the intense effort to prevent and correct deformity, and many self-help devices are available to replace lost functions of the extremities, especially the hands. Our thesis, in chronic arthritis, particularly the rheumatoid type, will concern itself with the management of hand deformities and disabilities. A program of prevention and correction will be developed.

Bunnell has aptly described the importance of the hand. Next to the brain, the hand is the greatest asset to man.[1] It is the organ of development of man's handiwork; it is also an organ of expression and a special sense organ for steriognosis. "Our brains are crowded with memories and conceptions of objects and actions which have been built up and developed by sensation through the use of the hands. . . . Our fundamental activities concerning shelter, food, combat and perpetuation, and in constructing, building, drawing, sculpturing and thinking derive from the hands." We, now in a mechanized "age of trauma," industry and mechanized warfare, are bound to have hand involvement due to trauma and disease. At the present time, the hand leads the list of compensable injuries. Disability of the hand is a serious economic problem since it provides the livelihood for the manual worker.

From an evolutionary standpoint, the brain-hand combination accounted for the superiority of man over animal. The brain developed the hand, and the mental processes improved because of the feeling and movement of the hands. Consider the remarkable self job of rehabilitation accomplished by Helen Keller despite the absence of the senses of sight and sound. Even in language and thought, the hand is most important: handle, handy, second hand, give the hand in marriage, all hands on deck, rule with a strong hand, et cetera. Since the hand is composed of exact machinery of much refinement, and the tissues are of great delicacy and specialization, the rehabilitation of the hand function, when upset by chronic arthritis, is a most important therapeutic procedure.[1]

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Pathology

There are many disturbances which produce hand problems. Closely allied to chronic arthritis are the following types: (1) skin and flexion contractures—scar tissue, keloids, flexion contractures due to infection and burns; (2) Dupuytrens contracture of the palmar fascia; (3) Volkmann's ischemic contracture associated with elbow injuries; (4) upper extremity disturbances—cervical motor or sensory root compression, scalenus anticus syndrome, brachial plexus injuries, shoulder dislocations, et cetera; (5) congenital deformities of the hands; (6) vasomotor and trophic hands—causalgias, sympathetic reflex dystrophies, collagen-type diseases, et cetera; and (7) tumors of all types. However, our discussion will be confined to the consideration of the impaired hand function associated with rheumatoid arthritis. Generalization of this discussion could easily apply to the above-mentioned syndromes.

The stages of development of the rheumatoid hand disability is that of early or late. In the early stages, the hand assumes the typical deformity of ulnar deviation, hyperextension of the metacarpophalangeal joints and acute flexion of the interphalangeal joints.[2] In the later stages, the clinical entity most commonly presented to the physiatrist for rehabilitation consists of ulnar deviation, flexion at the metacarpophalangeal joints and hyperextension of the proximal interphalangeal joints and flexion of the distal interphalangeal joints, contraction of the palmar fascia, subluxation of the proximal phalanges anterior to the metacarpal heads, and space loss at the proximal phalangeal joints.

Pathologic Physiology

The groups of muscles that supply the hand consist of the dorsal interossei, lumbricales, pal-

mar interossei, flexors and extensors of the fingers. The dorsal interossei are bipennate muscles which maintain the normal alignment at the metacarpophalangeal joints of the phalanges. The pull of these muscles is centered in a central tendon, hence producing an inefficient mechanical force of muscle contraction. Similarly, due to the extensive muscle weakness about the hand in rheumatoid arthritis, and the positioning of the fingers normally in ulnar deviation along with the index finger, there results a stretching and weakening of the radial components of the dorsal interossei; at the same time, the positioning results in a shortening and contracture of the ulnar components. Therefore, the angle of insertion to the central tendon is less acute and the pull is even less effective. The palmar interossei, which are fusiform muscles, transmit their tension directly to the tendon of insertion, thus increasing the mechanical force of muscle contraction. Hence the imbalance of the dorsal and palmar interossei may account for the deformity of ulnar deviation.

The second deformity, flexion at the metacarpophalangeal joints and extension of the interphalangeal joints, results from several processes. Because of the pain of the arthritic process, the patient tries not to flex the fingers; the least painful motion is flexion of the metacarpophalangeal joints with splinting of the interphalangeal joints to produce an alienated flexor function of the hand. Since the lumbricales are flexors at the metacarpophalangeal joints and extensors of the interphalangeal joints, they hypertrophy to the detriment of the extensors and flexors of the fingers. The net result is the deformity described at the beginning of the paragraph.

Clinical Procedure

The aim of rehabilitation of the rheumatoid arthritic hand must be a total one. The patient must be treated from the physical, psychological, vocational, medical and surgical aspects as indicated. However, if the arthritis is progressive, a conservative program must be outlined. It can be best summarized by the four "M's" of Rose's[6] treatment: motivation, mobilization, measurement and medication.

The deformities to be treated are: (1) metacarpophalangeal flexion, (2) deformity of finger flexion, (3) ulnar deviation. Supportive therapy consists of (1) assistive devices, (2) rehabilitative functional retraining, (3) steroid therapy, (4) general medical supportive therapy, (5) corrective plastic and orthopedic surgery.

The metacarpophalangeal deformity can be treated with assistive or unassistive stretching. Use of a smooth board with a lubricant, either dry or moist, with the fingers extended, and the palmar surface of the metacarpophalangeal joints is carried out. This also stretches the palmar fascia and the joint capsule. Counterpressure can be added over the dorsum of the hand by the therapist or the patient's other hand. In this way, the metacarpophalangeal joints are lowered, the fingers are extended, and the opposite hand is motivated. Making palm prints permits the patient to observe the progress of the procedure from week to week, and the prints can be kept as the progress record.

Finger extension deformity is best influenced by an inclined plane type of occupational device. The original concept of squeezing a sponge rubber ball to strengthen the hand and to correct the deformity is not sound physiologically or anatomically, since the hand is so constructed to grasp a cylindrical and not a round object. Rose advocates the inclined plane because it is a semicylindrical object well adapted to the function of grasp, and the opposing force of the handle surface resists compression in a plane perpendicular to its surface, thus tending to force the fingers radialward as they grip the handle. Also, at the same time, assisted flexion can be provided by the therapist or the hand of the patient. The adaptability of the inclined plane to other household objects and tools is readily discernible. Hence, a saw or hammer handle, electric iron or broom can be used during the day to provide further therapy to the afflicted hand. Care in application of treatment is emphasized because of the danger of trauma to tender joint.[4]

Ulnar deviation can be helped by several simple procedures of physical and occupational therapy. Any activity that exercises the dorsal interossei by stretching the ulnar components and strengthening the radial components is used. As in the previous two deformities, assistance can be by the hand of the therapist or of the patient. Hence, we use wide-spread abduction of the fingers, especially the second and third fingers abducted radially. Again, the finger tracings left by the patient can be a measure of progress and improvement.

The assistive devices fall into two categories,

i.e., exercisers and replacers. The ideal device is one that permits free hand function while supporting the fingers. There are three devices which will be described.

1. A curtain ring is placed in the palm of the hand, and is anchored by a leather strap around the wrist. Rubber bands of varying thickness are attached to the ring, and then are attached to the individual fingers by means of circular leather thongs fastened to the terminal phalanges. Effort on part of the patient to extend the fingers serves to produce a resistive exercise which gradually corrects the ulnar deviation.[5]

2. Modified deRosa glove.[3] This glove was modified by Small and Rose. It serves to reproduce the normal function of the finger extensors and dosal interossei. A wrist band is attached to the glove and has inserted into the hooks the rubber bands which provide the so-called muscle tension. The insertion of the rubber bands is on the glove at the radial side of the interphalangeal joints (corresponding to the dorsal interossei insertions) and into the dorsum of the proximal interphalangeal joints (corresponding to the finger extensors). This permits a variation of the intensity and direction of tension of the hands. Radiographs taken with the gloves on show the correction of ulnar deviation and alteration in the subluxation of the metacarpophalangeal joints. The glove further acts as a self-induced source of radiant heat, and so influences muscle relaxation, increases circulation to the area, and acts as a mild nerve analgesic. Routine strengthening exercises of the fingers may be used concomitantly. Such details can be obtained from any text on physical medicine and rehabilitation, and consist of proper rest positioning, finger flexion and abduction, hyperextension at the metacarpophalangeal joints, radial deviation of the hand and thumb, or widespread abduction and flexion of the fingers.

There are many mechanical devices, but the difficulties are mainly the cost, the nonpliability in carrying out an exercise program suited to the individual hand, and the general unadaptability to individual deformities of the hand. One such device* is made of ebony plastic with moving parts felt cushioned, rubber covered coil springs and self-tapping screws. It fits on a table top, and permits a great variety of hand and finger development exercises, mostly in resistance for finger flexion, right palmar fascia, and dorsal and palmar interossei. Where the hand is completely anklylosed, a "Handy Hand" device is available.† This device was designed based on on the principle of the hook used as a terminal device for a prosthesis by the amputee, and constitutes a rigid form fitting glove-like structure. The device is jointed at the metacarpophalangeal joint of the fingers, and the fingers and the thumb of the patient's hand are brought together in a firm grip by the tension of the elastic bands; it requires no voluntary motion by the patient and is limited only by the power of release and grasp through scapular motion. To arrange each hand for custom fit, the prosthetist takes a series of impressions in a manner similar to that of measuring an amputee stump for a prosthesis.

Similar devices may be used in total rehabilitation of the fixed deformities in which the hand is useless. Hence we have the variation of the opponens splints, lapboard with overhead sling attachments from the wheel chair, suspension feeders attached to overhead slings for support of the forearm and glass holder with attached glass straw, feeders mounted on stands, table cutlery attached to the basic hand splint, and similar assisting devices.

Comment

Hence, it can be seen that not only is correction possible to varying degrees with the proper type of physical therapy and occupational therapy, with or without assisting devices, but also where deformities are fixed, the assistive rehabilitation devices prevent the patient from becoming an invalid.

To obtain the maximum improvement, various types of orthopedic and reconstructive surgery can be used. It is not within the scope of this paper to elaborate on the procedures used. The use of steroid drugs has provided an excellent adjunct source of therapy, especially in diminishing rest pain, muscular and articular stiffness or joint pain and tenderness on motion. It permits more active exercises within a minimum of soreness, swelling and stiffness. There is no need to detail the mode of therapeusis with corticotropin, cortisone and hydrocortisone at this time. We also suggest protein supplements to obviate the

*Manuflex Company, 2130 N.E. Klickitat Street, Portland, Oregon.

†Robin Aids, 2015 Broadway, Vallejo, California.

negative nitrogen balance and osteoporosis that occurs (at times, the addition of sublingual androgens and estrogens are useful).

Conclusion and Summary

1. The brain-hand concept is one of the most important evolutionary creations, and must be maintained to permit economic and social effectiveness.

2. The concept of deformities of the hand in rheumatoid arthritis is developed as an imbalance of hand muscles, producing the various anatomical changes such as ulnar deviation, flexion and extension deformities of the fingers.

3. A program of physical medicine and rehabilitation is described. Assistive devices for an active program of improvement are outlined, and devices for hand substitution are detailed.

4. Medical and surgical adjunct management as concomitants are suggested.

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surrounding tissues. Similiarly, the success of a sciatic block depends upon familiarity with the distribution of the sciatic nerve and the exact point of infiltration. Sacroiliac injection is simple indeed and is based upon injection of the tender spots, as elicited on pressure over the affected area. The exact technique of infiltration can be found in recent textbooks on arthritis, and it is definitely worthwhile to become familiar with it, especially for those who treat rheumatic diseases. The extra effort thus entailed will be more than compensated by the gratitude of the rheumatic patient, whose suffering and disability will have been shortened by a comparatively simple method within easy reach of the average physician.

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Management of Rheumatoid Arthritis in Relation to Physical and Surgical Measures

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IT MAY BE that scientific progress will at some time either prevent rheumatoid arthritis or permit its arrest at the very outset. In such event, a millenium could be visualized when the crippling or disabling effects of this disorder would no longer prevail. But so long as the toll remains great despite such strictly medical resources as are yet available, more thought might well be given to adjuvant measures for minimizing the damaging effects and for rehabilitation. There is quite a wide field of applicability for such measures. But their utilization requires a considerable understanding of the pathological process in its secondary effects, its vicious cycle characteristics, and the consequent tendency to disability from deformity.

In true rheumatoid arthritis, bony ankylosis or rigidity of joints is the exception. Usually, the ultimate disability stems not from rigidity, but from the nonfunctional (and at the same time pain-inducing) posture which the affected joints have assumed. And the arrest or control of the basic disease itself is often thwarted by these secondary effects of dysfunction and deformity. The latter are in large measure preventable when understood.

Mechanisms of Deformity

Appreciation of the mechanisms involved in the development and progression of deformity is most important and involves recognition of some anatomic as well as pathologic details. Such details enable us to see that initially the deforming effect is of a negative or inhibitory character. Depending on the acuteness of a disease process in the joint, either early or, in rheumatoid disease, more often later, a positive or dynamic effect supervenes.

Most of the articulations of the body, or its extremities, have action which in one direction is opening-up ("extension") in the other, closing-in ("flexion"). Now rarely does any bony configuration limit the range of motion in either direction. The range of opening up is controlled or checked by a heavy fibrous capsular ligament, which is lined by a very thin layer of synovial membrane, contains very little elastic tissue, is not very vascular and is most susceptible to fibrosis and contracture.

In most joints, the range of closing-in is limited mainly by physical apposition or approximation of the adjacent segments of the limb. The capsular ligament on this extensor aspect is thin, very elastic, has a profuse synovial surface and is highly vascular. It is in this tissue that the initial inflammatory reaction occurs and, along with it, a synovial effusion into the joint.

Now, with all joints supplied with a delicate and automatic nerve reflex arc between capsule and corresponding muscle, the routine and automatic effect of inflammation and distention of capsule on extensor aspect is muscle inhibition, atony and atrophy of extensor muscles (irrespective of nature of disease process). Hence develops the first negative effect—progressive weakening of extensor function. The second negative effect arises from the fact that the flexor portion of the capsular ligament is non-elastic; when the joint is in position of extension, no space at flexor aspect prevails in which to accommodate the increased fluid content, but with the slack of a little flexion, space becomes available to lessen intra-articular tension.

Positive factors soon enter the picture. With the extensor muscle atony, the physiological balance of opposing muscle tones is upset in favor of the flexors. And whenever any muscle fails habitually to reach its full resting length, it undergoes progressive adaptation to a shorter excursion. Much the same adaptation, although at a slower rate, follows in the heavy fibrous flexor capsule. As the disease progresses, the inflammatory reaction spreads to the initially less susceptible synovial surface of this part of the capsule. Uniformly, and regardless of nature of disease process, an inflammatory process in this type of capsular tissue produces not inhibition, but spasm of corresponding muscles; and so another positive deforming factor enters the picture—muscle hypertonicity and fibrotic capsular infiltration.

In the digits, the existence and the complicated function of the so-called "intrinsic" muscles results in this disease in a much more puzzling (but still understandable) deformity picture. This will be

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elaborated on below, but for the moment consideration may rest with the above basic and general factors in deformity production.

Measures to Combat Deformity

Reverting to the above sequence of pathological or physiological events, the first logical approach would be to combat the reflex muscle atony and atrophy by massage and exercises, at first gentle but progressing to resistance exercise, which alone will restore muscle power. This would be in addition to articular heating (mild) and massage. It could well be mentioned in the latter connection that simple acute hyperemia without mechanical emptying of engorged venous and lymphatic channels by massage and exercise is of limited value.

Later, when in a moderately advanced stage adaptive shortening of antagonistic muscle groups and capsule has occurred, the treatment must start with gentle stretching of the muscles until the articulation will permit passively a close to normal range of extension. No muscle can be built up far unless it can assume close to its maximum position of contraction. The passive or assisted exercises must continue until this can be achieved actively and proceed against resistance or load.

Protective Relief of Pain

All too frequently, a stage of the disease has supervened where the vicious cycle of pain on any movement, reflex inhibition and reciprocal atony and contracture all prevail. Measures must be sought to break this chain of events. These are available in the form of protective splinting or bracing. But in this connection, account is taken of the known fact that prolonged and uninterrupted immobilization is distinctly harmful in rheumatoid disease (save where its necessary aim is to secure competent rigidity of a hopeless joint). So fixed splinting must be interrupted for increasing periods in the day as the cycle resolves itself.

Splinting and bracing have the following three forms of utilization: (1) rigid, (2) electively rigid, and (3) dynamic. The rigid splint, which may be metal, plastic, or plaster-of-Paris, is adapted to two phases. It may have to be utilized primarily for relief of pain by rest and relaxation of spasm, and may have to conform to an existing position of deformity. As relaxation occurs, the posture of the splint will be changed progressively to the optimum physiological one, this being a little short of the normal extension range of the articulation. For example, in the lower extremity the ankle would be at a right angle, the knee at about 10 to 15 degrees short of full extension, and the whole limb held in neutral position at the hip (when it is involved) by a cross-bar. The wrist should be in a position of moderate extension without ulnar deviation, basal finger joints in a few degrees flexion, interphalangeal joints (see below) in 45 degree flexion. The rigid splint may eventually be for night use only.

An "electively rigid" splint or brace has its usual application to the lower extremity (and may include features of controlled range or mobility). For example, after obtaining correction of flexion contracture at the knee, quadriceps re-education to such strength as will prevent sagging posture on weight-bearing may be only slowly obtained; yet walking activity may be most desirable. So a long knee-locking leg brace is utilized, maintaining extension on weight-bearing only. With crutches and bilateral bracing, one side can be unlocked at a time for steppage and reciprocal joint motion re-education.

The wrist joint presents a very dominant indication for progressive correction of flexion deformity, and not only from the weakness of digital function which that deformity entails. For self-assistance with hands, the flexed wrist posture prevents taking weight on the "heel" of the hand. The sensitive fingers will not permit pressure, so the individual pronates the hand to take pressure at its radial thenar aspect. This flattens the thumb into the palm and produces ulnar deviation of the digits as well as the wrist in a very damaging fashion.

Though seemingly apart in character from splinting or bracing, nevertheless shoe design and correction to prevent or control the anticipated pronation or valgus deformity of that area stems from the same basic considerations. Deformed and painful feet militate against control of posture and balance in the joints above. In subtalar involvement (the commonest), the peroneal muscles—themselves supplementary foot flexors—are prone to spasm with a vicious cycle of other foot deformities. Shoe adjustments alone may be inadequate, indicating further assistance by a T-strap at the inner side of the ankle, pulling to an upright on the other side.

The third form of mechanical aid is termed "dynamic" splinting. It has long been used in joint trauma for the purpose of correcting contractures

and re-educating muscles, with applicability to hand conditions much stressed by Bunnell, so that his name is commonly attached to such procedures. They constitute mobile splinting, in which functional activity of muscles and joints obtains, but with springs or elastic bands assisting weak muscles or stretching contractures. This has a considerable field of utilization for the rheumatoid hand.

Fig. 1. (*above*) Mr. G. Interphalangeal hyperextension deformity, from secondary displacement and overpull of intrinsics. A rheumatoid residual, though typical of condition known as the "pin-roller's hand."

Fig. 2. (*below*) Mrs. T. Left hand is illustrative of ulnar deviation deformity of digits. The right hand, in which the deformity was more severe, has been surgically corrected.

Prolonged Forcible Correction

Other methods for overcoming contractural deformity involve the gradual and continued application of greater force. One example is the use of weight traction, especially in resistant flexion contracture at the knee. It is most important that this be overcome for many reasons. First is the fatigue load on the initially weakened extensor apparatus, when standing or walking is done with knee in flexion. It takes a minimum of extensor muscle power for stability in full or nearly full extension; but overwork, strain and fatigue are constant otherwise and increase disproportionately with an increasing angle of uncorrected flexion. Second, it is a known fact of kinetics that while a large arc of flexion is not necessary for rebuilding of power, a close to normal range of extension is essential. A third consideration is that standing or walking with knees partly bent imposes traumatic strain on the feet, as well as fatigue both at hips and low back, all these sites being prevented from normal static balance.

Fig. 3. Mrs. M. Digital effects of rheumatic disease in feet. Complete dislocation of metatarso-phalangeal joints. To initial physical inspection, the hammer toe effects are the more obvious ones.

Finally, in this defective posture, there resides the probability of secondary joint damage of chronic traumatic nature sustained by the femoropatellar articulation. Unlike other joint cartilage, that of the patella is not physiologically adapted to sustained compression; and that is what it receives, for definite mechanical reasons, when weight is constantly taken in much knee flexion. This particular chondrous tissue is very susceptible to attritional breakdown; and the sensitiveness thereby engendered reflexly adds to weakness and instability. It should not be forgotten that hyaline cartilage has no reparative or replacement capacity whatever.

Early flexion contracture at the knee of not over 30 degrees will usually yield in a week or two to 10 or 15 pounds of "Buck's extension" traction. A greater degree of deformity must be met by the initial use of a type called Russell's balanced traction, which serves to correct the tibial subluxation along with the flexion.

Contractures of 45 degrees or more of any duration are likely to necessitate the use of the hinged and progressively wedged plaster cast, the hinge joint being placed just a little proximal to the joint line in order to encompass correction of the subluxation. It is quite necessary to protect the subcutaneous surface of patella and dorsum of foot

with thick sponge-rubber padding, and the back of the heel by a window. Contractures of greater degree or of long standing usually require the well-established surgical procedure of posterior capsulorrhaphy.

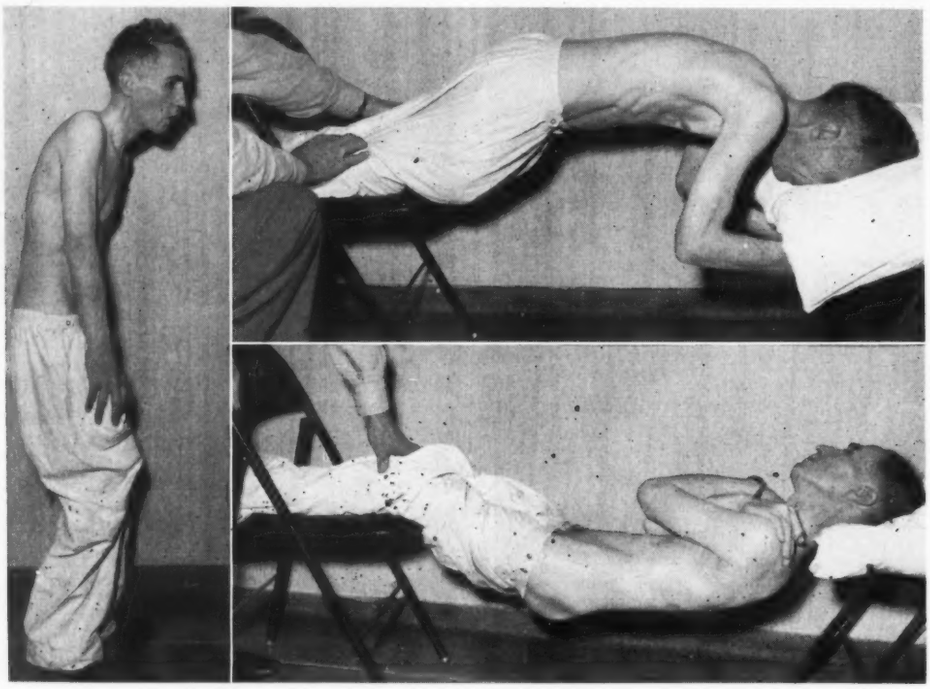

Fig. 4. Mr. B. Bony rigidity, of fifteen years' duration, extending from skull to knees, latter mobile. Note in standing view how flexion posture in knees is imposed by flexion deformities above. Patient was perfectly comfortable suspended either prone or supine between head and knees.

The Rheumatoid Hand

Separate consideration of hand deformities is indicated by reason of the kinetic factors inherent in the presence there of what are termed the "intrinsic muscles" and in their complicated anatomical and dynamic relations. While a small part of this muscle group accomplishes "fanning" action of the fingers, the major function is that of extending the small joints when the basal ones are flexed. The initially persistent relaxation in posture of flexion of the basal joints gradually results in disturbed kinetic effects, which bring about a vicious cycle of progressive deformity of the hand. The stages by which this comes about and also how it can be combatted are understandable.

With an initial process of effusion, synovial proliferation and capsular distention, the weaker dorsal portion becomes thinned out and lax, permitting a palmar subluxation, at the metatarsophalangeal joint, of the base of the phalanx. The normally axially placed tendons of the intrinsics displace palmar-ward with the phalanx. The resultant functional action then becomes one of further flexion and subluxation, with increasing resistance in efforts to "open" the hand. With extensor capacity thus weakened at the basal joints, spasm and instinctive "over-pull" of the intrinsics in their function of extending the small joints bring about the commonly observed attitude of interphalangeal hyperextension and finally, by contracture, a fixed hyperextension. "Closing" of the hand can then be accomplished only by flexion action of the stiffened fingers at their bases. As this now can be accomplished by both the intrinsics and the essential flexors, the balance is completely upset, the weakened essential (long) extensors being at the same time mechanically blocked in their function by the basal subluxation.

Such progressive hand (and also wrist) deformities and weaknesses are a paramount indication for the use of the Bunnell type of dynamic corrective splinting. Such appliance, worn on the back of the hand and wrist, is not in the way in most activities. It is adapted to give constant elastic uplift to the flexing and subluxating basal phalanges and to allow active vigorous function of the flexors to act on the interphalangeal joints

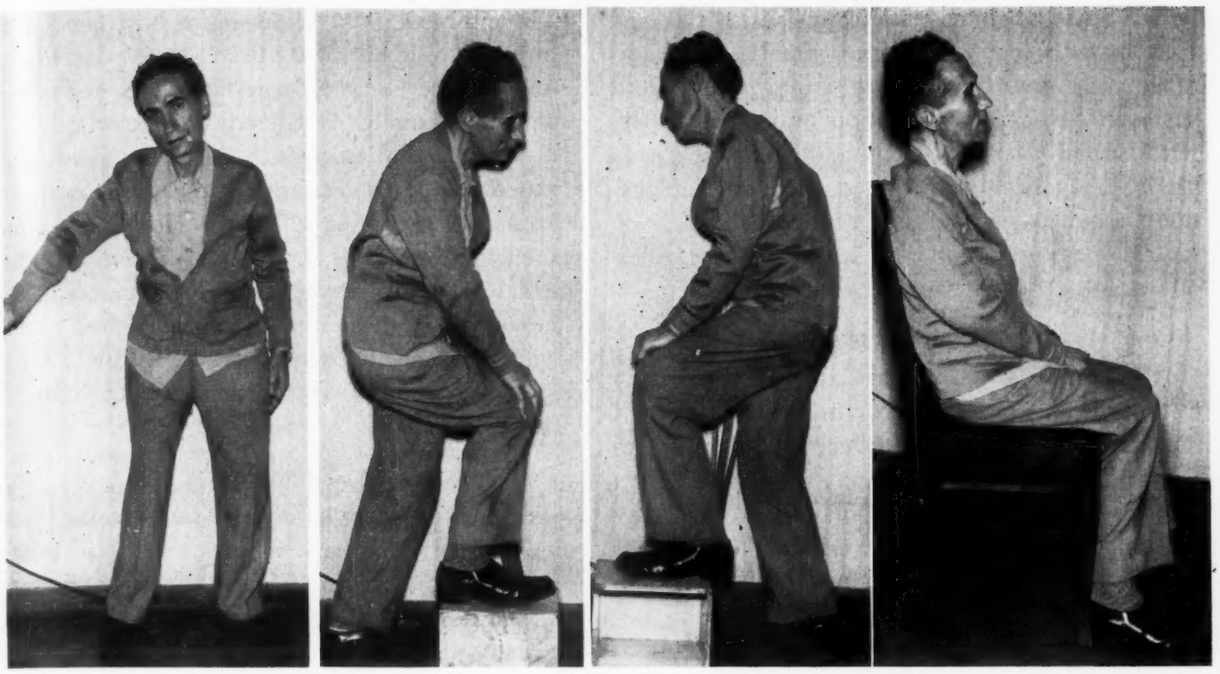

Fig. 5. Mr. B. After bilateral hip arthroplasty. Erectposture (within limits of flexed spinal column) obtained as well as 90° flexion range at hips. This patient wasshown going up and down steps on one of the television periods of the 1954 Michigan Clinical Institute program.

and overcome their hyperextension. When there is contractural tension in the joints, they can be constantly or intermittently stretched by a light elastic pull to the finger tips of a cotton glove.

Ulnar Deviation

A frequently seen secondary (and occasionally primary) hand deformity, and one also susceptible of restraint by dynamic splinting, is that of progressive ulnar deviation of the digits at their bases. Irrespective of initiatory factors, once under way, palmar subluxation of the tendons of the radial intrinsics and ulna-ward slipping off the knuckle of the long extensors set up a vicious cycle for progression through functional activity. It is more commonly seen in the rheumatoid hand of a woman than that of a man, and should be for reasons associated with anatomical differences of normal posture. Also for good reasons it is more common in those who, by reason of lower extremity disability, must do much grasping of chair-arms, and in those who because of a wrist flexion deformity cannot use the "heel" of the hand, and so obtain support from the radial or thumb side by pronation.

Advanced ulnar deviation deformities of the digits are perhaps the ones which most dramatically represent the outcome of a vicious cycle of disbalanced kinetic forces, secondary to—but operating without any positive contribution from—the pathologic process in the articulation itself. While dynamic splinting, including an elastic pull opposing the direction of drift, is effective at an early stage, at an advanced stage functional rehabilitation can be secured only through reconstructive surgery and with limited goals.

Foot Deformities

Mention has been made above of atonic effects on postural control of ankle and foot. With resultant planus and valgus and mechanically consequent further damage to the subtalar joint, the inevitable response of peroneal spasm occurs. The forefoot is abducted and everted; the great toe yields to pronation pressure; the small toes, pressed against the outer side of the shoe vamp, automatically curl and retract. Their intrinsic musculature, now unbalanced, enhances the deformity.

To any observer, the "hammering" of the toes is obvious enough. What is less apparent is a progressive and rapidly complete dorsal dislocation of the proximal phalanges on the metatarsal heads, and a consequently miserable situation for weight-bearing function.

Corrective shoeing and ankle brace control are effective only if instituted at the outset of symptoms. Splinting is not applicable. The attack must be very aggressive once any deformity has devel-

oped. Since alignment statically is essential and mobility of minor importance, manipulative correction and immobilization to obtain rigidity must be resorted to. A combination of intramedullary pin fixation of corrected toes and boot cast is very useful. Advanced deformities, including dislocations, require open surgical reconstruction. Such radical measures should be introduced regardless of control of arthritic processes elsewhere.

Major Surgery

It is probably well appreciated that in many instances the "burned-out" arthritic patient, if not too long bedridden, can be very considerably rehabilitated by major surgery. For instance, an extensively destroyed knee joint or hip joint may be completely disabling, not through loss of mobility, but from inevitable pain on any functional effort or from anklyosis in position of the deformity. Resection and arthrodesis in optimum position restore its basic usefulness. In selected cases of bilateral ankylosis, complete or partial, arthroplasty may bring very considerable rehabilitation, not only in the above joints but also for the elbow.

What is less extensively appreciated is the rehabilitative possibilities in certain types of painfully disabling but relatively mobile knees, impaired by residual rather than active pathological effects. One such type represents a pathologic condition largely restricted to excoriation of patella articulation, which is most successfully treated by patellectomy. Another constitutes chronic hypertrophic villus synovitis and permits excellent restoration of painless function by either partial or total synovectomy. In instances of the synovectomy, where sometimes the excised pathological tissues will amount to two fistfuls, a striking amelioration of symptoms in remote joints has often followed.

Summary

For, on the one hand, the amelioration and, on the other, functional repair of the local effects of rheumatoid arthritis, there must be first an understanding of the tendencies to and the mechanisms of deformity. Secondly, there is frequently need for logical preventive and corrective measures by physical means. The more effectively invalidism can be combatted, the more likely is the disease to be brought under control. Surgical measures to overcome invalidism during the course of the disease need be kept in mind as well as for rehabilitation at a "burned-out" stage.

GROWTH OF BONES IN MAN

(Continued from Page 300)

little precise biochemical information about most of these processes, particularly the manner in which matrix forms, how absorption occurs and especially the manner in which growth hormone acts. The necessity for continuing research is obvious, and it is urged that such research include primate material as far as possible.

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Polycyclic Continuous Acute Gouty Arthritis

Long-Term Clinical and Metabolic Study

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GOUT typically shows an episodic pattern of joint involvement with entirely symptom-free periods between the attacks. Persistent arthritis in a gout patient seldom is due to continuing gouty activity; more often it represents traumatic arthritis in a joint injured during the period of vulnerability induced by acute gout or, in other cases, secondary osteoarthritis activated by antecedent gout. Persistent joint disability also occurs in chronic gouty arthritis, a poor designation which denotes intimidation of joint function by extensive tophaceous deposits. Finally, there remain a few patients with polycyclic continuous acute gouty arthritis; that is, attack after attack occurring so close together in time that, instead of the usual asymptomatic interval between attacks, there occurs only some periodic lessening in the intensity of symptoms.

This report is concerned with a patient who developed uncontrollable polycyclic continuous acute gouty arthritis. The causative factors appeared to be three: (1) the patient's gout was unusually severe and active, (2) the usual therapeutic effects of colchicine were unavailable because of the existence of hypersensitivity to this drug, an extremely rare misfortune, and (3) the endocrine adaptive mechanism of the hypothalamo-pituitary-adrenocortical system which may assist in ending acute gouty arthritis was incompetent because of the existence of selectie hypopituitarism-with-respect-to-corticotropin. In other words, he was deprived of the two best defenses against gout in the presence of disease of unusual activity.

The study covers a period of almost 2,900 days since June, 1946, and is divided into seventeen periods of different lengths on the basis of treatment used (Table I). In the first two and one-half years of the study, the treatment given was conventional and consisted largely of careful attempts to derive the maximum benefit from measures of accepted value. By the end of December, 1948, it was quite clear that this procedure had failed. The patient, despite all efforts, was hospitalized with the most severe gout the writer has yet seen. He had lost 68 pounds in a little over a month. A falling creatinine coefficient indicated loss of muscle mass. Renal impairment also was advancing, and the outlook for a return to normal activity, or perhaps even for life, was increasingly discouraging. His treatment thereafter consisted chiefly of newer experimental modalities and will be discussed in detail.

Some of the findings during the period before 1950 were presented at the First Armour Clinical ACTH Conference.[7] Six features of our experience with this patient are unique and have not previously been reported in the medical literature: (1) maintenance of full colchicinization at maximal tolerated levels for a period of six years, (2) continuous administration of corticotropin in suppressive, individually adjusted dosage for four years in a gout patient, (3) prompt, but temporary, relief of acute gouty arthritis by adrenal cortical extract in large dosage, (4) permanent cure of hypersensitivity to colchicine by a brief course of corticotropin, (5) the existence of selective hypopituitarism-with-respect-to-corticotropin as a well differentiated endocrinopathy with predictable consequences upon the course of gout, and (6) simultaneous use of full continuous colchicinization, suppressive corticotropin dosage, phenylbutazone, and probenicid to achieve maximum control of gout.

Methods and Subjects

The biochemical methods employed are those described in the earlier report of Wolfson and Cohn.[7] Urinary neutral Pettenkofer chromogens were estimated by the method of Munson and coworkers,[3] 17-ketosteroids by the method of Robbie and Gibson.[5]

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TABLE I.

Study Period and Days Duration	Colchicine Route and Tolerance mg./day	Corticotropin Requirement units per day	Phenylbutazone or Probenicid grams per day	Articular Symptom Index arbitrary units	Blood Pressure mm. Hg.	Serum Urate mg. %	Serum Creat mg. %	Curate Creat	17-KS Creat mg./day	P.C. 17-KS	Serum Cholesterol and Ester Per Cent mg. per 100 ml. & per cent of total	Weight* pounds	Creat Coeff**Z mg./kg./ day	Creat (GFR)** c.c./1.73 sq. m.
A. 1 to 853	Traditional brief courses only	—	—	>200	130-150 70-104	11.8 11.8	1.05 1.06	0.025 0.025	1.3 (ket)	—	199 68% ester	284	24 (32)	112 (149)
B. 854 to 915	Fully colchicinized, oral, 0.36	—	—	300		14.3	1.05	0.022	1.2 (ket)	—	240 69% ester	218	23 (23)	102 (104)
C. 916 to 1165	Fully colchicinized, i.v., 0.42	occasional in attack	—	<200		10.0	1.00	0.058	—	—	204 70% ester	270	17 (22)	85 (108)
D. 1166 to 1190	I.v. route ris from 0.42 at beginning to 1.20 at end	61.01 (1949 fall hay fever season)	—	<150		8.0	1.05	0.033	—	—	— —	270	19 (24)	97 (122)
E. 1191 to 1212	Fully colchicinized, i.v., 1.20	—	—	>150 100		13.0	1.25	0.033	—	—	— —	264	19 (23½)	97 (120)
F. 1213 to 1512	Fully colchicinized, oral, 2.50	occasional in attack	—	>150		11.5	1.57	0.044	4.0	—	— —	276	19 (25)	60 (78)
Suppressive Use of Long-Acting Corticotropin in All Subsequent Periods														
G. 1513 to 1602	Fully colchicinized, oral, 1.70	58.8 (plus low calorie diet; 1950 fall hay fever)	—	<100	150 106	13.7	1.64	0.049	5.1	—	— —	256	18 (22)	71 (85)
H. 1603 to 1632	Partial withdrawal of colchicine for trial of N-methylcolchicamid, aver: 1.25	39.4	—	163		10.2	1.28	0.045	5.2	—	242 74% ester	261	16 (20)	53 (65)
Fully Colchicinized to Tolerance by Oral Route—Plus Suppressive Use of Long-Acting Corticotropin in All Subsequent Periods														
I. 1633 to 1692	Fully colchicinized, oral 1.70	41.6	Probenecid 2.0	30	150 70	6.4	1.42	—	—	—	252 71% ester	276	—	—
J. 1693 to 1742	Fully colchicinized, oral 1.83	39.4	—	92	154 110	10.3	1.18	—	—	—	179 —	286	—	—
K. 1743 to 1832	Fully colchicinized, oral, 2.10	33.9	Probenecid 2.0	98	—	—	—	—	—	—	— —	—	—	—
L. 1833 to 1882	Fully colchicinized, oral, 2.10	56.4	—	154	154 100	10.3	1.20	—	—	—	169 68% ester	—	—	—
M. 1883 to 2022	Fully colchicinized, oral, 2.10	55.8	Probenecid 1.0	84	155-180 110-120	7.4	1.45	0.076	5.5	0.26	188 70% ester	284	20 (27)	66 (88)
N. 2023 to 2222	Fully colchicinized, oral, 2.50	23.5	Probenecid 2.0	98	168-170 110-114	6.4	1.49	0.104	4.1	0.19	150 71% ester	278	21 (27)	68 (89)
O. 2223 to 2472	Fully colchicinized, oral, 2.50	19.7	Phenylbut. 330	68	150-166 108-115	9.9	1.20	0.038	—	—	248 81% ester	283	21 (28)	85½ (114)
P. 2473 to 2672	Fully colchicinized, oral, 2.42	24.6	Phenylbut. 200	84	168 108	9.4	1.29	0.058	5.4	0.34	— —	297	20 (28)	74 (103)
Q. 2673 to 2892	Fully colchicinized, oral, 2.34	19.6	Probenecid 2.0 Phenylbut. 400	64		6.5	1.30	0.088	—	—	264 78% ester	297	20 (28)	74 (103)

Pharmacologic Comparison of Treatment Schedules in Gout. Calculation of the articular symptom index is discussed in the text. Except during Period B, the values indicated for Periods A through G are estimates based on a somewhat different recording method used at that time. The urate clearances, creatinine clearances are based on 24-hour samples of urine. The abbreviation (ket) indicates a 17-ketosteroid value (17-KS) was obtained on a ketonic fraction. P.C./17-KS is the ratio of Pettenkofer chromogen to 17-ketosteroid in the crude neutral urinary steroids. In the final two columns, the figures not in parenthesis are calculated from actual body weight while those in parenthesis are based upon 120% of ideal body weight and probably are more realistic. The values for these two functions in Period A appear implausibly high.

AGE: 39
HEIGHT: 5'10"
WEIGHT: 270
ONSET OF CLINICAL GOUT: 1939
MARRIED, ONE CHILD

RENAL FUNCTION:

HISTORY OF ACUTE G.N., 1922
TRANSIENT NEPHROTIC EPISODE, 1924
NORMAL SEDIMENT, FT.T. ALBUMIN
NORMAL I.V. PYELOGRAM
GLOMERULAR FILTRATION RATE, 117 c.c./min./1.73 sq.m.
NO HYPERTENSION

ENDOCRINE STATUS:

URINE 17-KETOSTEROID, MG./DAY:	1.66
SPERM COUNT, PER EJACULATION:	100,000,000
NORMAL BODY HAIR, MALE BITEMPORAL BALDNESS	
CREATININE COEFFICIENT:	20.5
ABNORMAL CREATINURIA:	ABSENT
BASAL METABOLIC RATE:	-9%
RESPONSE TO 25 MG. ACTH,	
FIRST TEST DAY:	ABSENT
FOURTH TEST DAY:	SUBNORMAL
RESPONSE TO 0.3 MG. L-EPINEPHRINE,	
NO ACTH PRIMING:	ABSENT
AFTER ACTH PRIMING:	ABSENT

HEMATOLOGICAL FINDINGS, MEDIAN

ERYTHROCYTES:	4,650,000
HEMOGLOBIN:	13.8 GM.%.
HEMATOCRIT:	42
TOTAL LEUKOCYTES:	8600
EOSINOPHILS (Randolph):	260
LYMPHOCYTES:	2160
MONOCYTES:	515
GRANULOCYTES:	5665

PURINE METABOLISM, MEDIAN:

SERUM URATE:	10.8
SERUM OXYPURINE:	0.24
SERUM CREATININE:	1.03
URINE URATE/CREAT.:	0.41
URINE OXYPURINE/CREAT.:	0.01
$C_{URATE}/C_{CREATININE}$:	0.049

LIVER FUNCTION:

NO SIGNIFICANT FUNCTION DEFECT
SERUM CHOLESTEROL;
INTERVAL: 223, 67% esters
ATTACK: 166, 69% esters

Fig. 1. Basic history and certain significant laboratory findings in Mr. M. K.
The data shown were included in our first report on this patient.[7] Two subsequent normal serum P.B.I. values and normal urinary gonadotropins during long-term corticotropin treatment are additional evidence for normal gonadotropic and thyrotropic function by his pituitary. There is still no urinary abnormality except for traces of albumin. The excellent preservation of glomerular filtration rate with serum urate concentrations continuously over 10 mg. per cent since he first was seen represents a distinctly unusual combination. The typical extremely low 17-ketosteroids (ketonic) with normal spermatogenesis is an interesting and frequent finding in the gouty patient.

Articular activity was graded each day in a scale from 0 to 3-plus; the figure used for the day was that applicable to the most severely involved joint. This quantitative scale was not rigidly adhered to until period H. In earlier periods, except B, quantitative estimates are approximate. However, in period B all days of the period had 3-plus activity. The *articular activity index* is the sum of 3 (per cent of days with 3-plus activity) plus 2 (per cent of days with 2-plus activity). This calculation ignores minimal (and therefore somewhat equivocal) activity and, logically, it weights severe involvement as more important than moderate involvement. The maximum value of this index is 300.

The corticotropin occasionally given briefly for attacks in Periods A through F usually was aqueous crude corticotropin. Thereafter only long-acting preparations were used, generally once every day to once each week except for a brief period of twice daily administration in Period G. The patient was carefully trained in dosage self-regulation according to principles outlined elsewhere.[4]

The following medications were given routinely and receive no specific mention in the tables: (1) two grains of desiccated thyroid during long-term corticotropin therapy, (2) pyribenzamine during the hay fever season (last two-thirds of August, September, first third of October) each year beginning in 1949, (3) supplementary potassium chloride and calcium lactate according to schedules given elsewhere[4] when average corticotropin dosage was over 40 units/day, (4) antibiotics of appropriate nature during infectious disease or minor surgery, such as dental extraction.

The establishment and maintenance of full colchicinization was accomplished as follows: When the intravenous route was used, some selected dose was given daily until diarrhea occurred. None was then given until these symptoms ended. Daily ad-

ministration then was resumed at a very slightly lower level. If no diarrhea occurred within a week, the possibility of a slight increase in tolerance was explored by slight elevation of dosage. A similar technique was used to determine daily oral colchicine tolerance. Intravenous colchicine tolerance has not been estimated in gout patients other than Mr. M. K. Maximum oral tolerance has been determined in a number of other patients. It is seldom less than 1.5 mg./day or more than 2.5 mg./day. The maximum fluctuation in tolerance from year to year rarely exceeds ± 0.5 mg./day. No toxic reactions to full colchicinization have been observed in a number of patients so treated for more than five years.

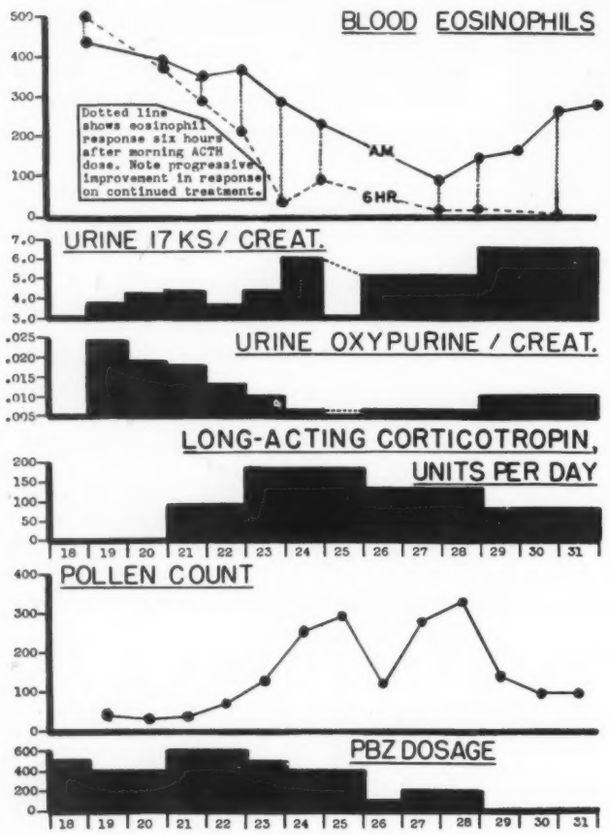
BLOOD EOSINOPHILS
Dotted line shows eosinophil response six hours after morning ACTH dose. Note progressive improvement in response on continued treatment.
AM
6 HR
URINE 17 KS / CREAT.
URINE OXYPURINE / CREAT.
LONG-ACTING CORTICOTROPIN, UNITS PER DAY
POLLEN COUNT
PBZ DOSAGE
18 19 20 21 22 23 24 25 26 27 28 29 30 31

Fig. 2. Confirmation of hypopituitarism-with-respect-to-corticotropin in Mr. M. K.

The minimum response detectable in the eosinophils of a normal subject after one similar corticotropin dose was not obtained until four doses were given; an average normal response was not obtained until the end of the study. No significant increased excretion of 17-ketosteroid appeared for three days. Together with previously reported data,[7] these findings show that Mr. M. K.'s adrenal cortex is markedly unresponsive to initial doses of corticotropin but eventually responds normally after continued stimulation. The implication of this finding is that the spontaneous secretion of corticotropin by the pituitary is greatly reduced. The additional requirements for the suggested diagnosis are the demonstration that other hypophyseal functions are essentially intact; these data are given in Figure 1.

The significance of the occurrence of this selective pituitary defect in gout patients is twofold. They will be unable to terminate their attacks by releasing extra corticoid and, in addition, their attacks will be relieved only slowly by exogenous corticotropin since the adrenal cortex must first be stimulated for a period.

There is at least a hint of a more basic relationship between this disturbance and gout. All four known patients with this endocrinopathy have been gout patients.[1,2,7] In addition, the defect of rebound hypersecretion of corticoid often observed after withdrawal of exogenous corticotropin from gout patients may represent a transition stage between the normal function and the full-blown endocrinopathy shown here.

Results

Figure 1 summarizes certain important aspects of the patient's history and laboratory findings prior to the institution of corticotropin therapy. His marked obesity is interesting and intractable. The absurdity of labeling such a patient as uncooperative because he refuses semi-starvation has seldom been more apparent than in this man who has so carefully kept his own records and has gone to great efforts to make possible this unusually prolonged study.

Table I summarizes the successive therapeutic periods of the study. Two general points deserve comment in addition to those included in the latter description of successive changes. (1) Long-term corticotropin treatment for four years did not result in any persistent hypercorticoid manifestation. There was, for example, no progressive hypercholesterolemia such as is seen if the effects of corticogenic hypothyroidism are not prevented. The creatinine coefficient showed a gain in muscle mass, not the loss of muscle seen in Cushing's syndrome. (2) In our earlier report[7] we described the surprising disappearance of hypersensitivity to colchicine during the first course of corticotropin treatment. It will be noted that this hypersensitivity never has returned.

Figure 2 confirms the existence of initial unresponsiveness of the adrenal cortex to corticotropin which previously had been shown by other studies.[7] Since thyrotropic, growth, and gonadotropic functions of the pituitary appeared normal (Fig. 1) and since the slow appearance of increased adrenocortical function could be elicited with persistent stimulation, there is ample evidence for the diagnosis of selective hypopituitarism-with-respect-to-corticotropin. The clinical significance of this defect is easily understood: studies have shown that increased endogenous secretion of pituitary corticotropin ultimately will terminate severe attacks of gouty arthritis in the usual gout patient, but this

protection was absent in Mr. M. K. So far as one can tell from relatively imprecise data on metabolic functions and 17-ketosteroid output, continued stimulation eventually restored at least normal responsiveness to the adrenal cortex.

In Period A (Table I) treatment consisted primarily of attempts to give the usual courses of oral colchicine but, of course, without success since so little could be given. Low fat, high protein, high carbohydrate diet; low fat, low protein, high carbohydrate diet; intravenous glucose during attacks; 5-pregnenolone, pregnentriolone, testosterone and other androgens, podophyllotoxin, estrogens and certain other suggestions were evaluated. None modified the disease course.

In Period B, 3-plus articular activity was present continuously. Because maintenance of full colchicinization had been found highly effective in other gout patients subject to frequent attacks, it was prescribed for Mr. M. K. By the oral route the average daily colchicine tolerated without bloody diarrhea was only 0.36 mg. per day. At this point, in December, 1948, a single intravenous infusion of 50 ml. of a specially concentrated aqueous adrenal extract prepared by the Wilson Laboratories was given to test the importance of this hormonal factor. Marked relief began two hours after the rapid infusion and ended abruptly thirty-six hours later, when the attack returned with a fury unequaled in the writer's experience. It seems unlikely that more than 25 mg. of hydrocortisone could have been contained in this 50 cc. of extract. Its prompt relief of the attack suggests a very low level of endogenous cortical secretion. The exacerbation after thirty-six hours suggests that even less corticotropin was secreted at this time than before the infusion.

In Period C, in the hope that bypassing the gastrointestinal tract would enable more colchicine to be given without diarrhea, the patient was transferred from oral to intravenous colchicine, but still carried at maximally tolerated dosage. The slight extra amount of colchicine which could be given by this route (average tolerance 0.42 mg./day) appeared of critical benefit and the severe attack gradually subsided. Control of serious flare-ups became possible during this period because of the availability of ACTH. The excellent response of other gout patients to single 50-unit doses of this hormone so contrasted with Mr. M. K.'s poor response, until several successive doses had been given, that it aroused suspicion of hypopituitarism-with-respect-to-corticotropin. Except when bloody diarrhea was present on each of the 150 days of this period, the patient received intravenous colchicine. Since he had exceedingly poor superficial veins, and since administration of colchicine outside a vein creates an area which remains painful for up to several weeks, this was a trying phase both for the patient and his physician. Even with corticotropin to terminate severe episodes, the patient was not really well during this period. He worked every day but sometimes with great difficulty.

The fall hay fever season of 1949 was used to study the effect of prolonged corticotropin treatment on both the patient's gout and hay fever. The data obtained during this period, Period D, have been discussed in detail elsewhere.[7] The patient entered Period D with an intravenous colchicine tolerance averaging 0.42 mg./day. Sometime during the administration of this course of corticotropin, his hypersensitivity to colchicine disappeared so that in Period E, although no corticotropin was given, he manifested an average intravenous colchicine tolerance of 1.20 mg./day. This seemed so encouraging that a trial of full oral colchicinization was undertaken in Period F. This revealed that almost normal colchicine tolerance now existed and permitted abandonment of the intravenous route. The difference between treatment given in Period C and Period F is merely the difference between a colchicine tolerance of 0.42 mg./day and one of 1.50 mg./day, since in both periods corticotropin was used to control severe episodes. Clinically, however, Period F marked the first time when there really were days on which no articular activity was present.

Period G opens with the beginning of the fall hay fever season of 1950. It provided a convenient point to begin the patient on long-term corticotropin therapy together with full oral colchicinization. Since the patient's weight had risen from 218 to 276 pounds in one and one-half years, the high dosage initial phase of treatment was also used as an umbrella against the precipitation of acute gouty arthritis by drastic dieting. Finally, the metabolic studies of this period once again permitted examination of the responsiveness of the adrenal cortex to initial stimulation.

Figure 2 shows the initial portion of Period G. On the first two days the patient had a food intake of 300 calories and received morning doses of 90 units of long-acting corticotropin. The same caloric ration was continued for three more days but two doses each of 90 units of long-acting corticotropin were given each day (equivalent approximately to a single 216 unit dose each day). The caloric intake was then increased to 600 calories for six days. On the first three a single 135 unit dose of corticotropin was given, on the last three a single 80 unit dose was given. At no time did this drastic restriction of food intake result in more than fleeting twinges although 14 pounds were lost in an eleven-day period. Examination of either eosinophil or metabolic data shows marked failure of response until several doses of long-acting corticotropin had been given. The normal adult given one 90 or 100 unit dose of long-acting corticotropin shows a median 91 per cent depression of eosinophils six hours later; *all normals* show at least a 40 per cent depression six hours after the initial dose.[6] Mr. M. K. did not show a 40 per cent six-hour eosinopenia until his fifth 90 unit dose and a 90 per cent eosinopenia was not observed until he had received his fourteenth dose, that is, until he had received 1,350 units of corticotropin. Similar delayed response in metabolic indices established the unequivocal existence of an unresponsive adrenal cortex prior to therapy. Its ultimate restoration by corticotropin showed that pituitary hyposecretion of corticotropin was at fault while the intact function of all other endocrine glands showed the defect to be selective. High fat diets, inade-

quate caloric intake, and ketosis have long been known to induce an anti-uricosuric effect (they raise plasma urate and decrease urate clearance and urine urate) which is an exact opposite of the uricosuric effect of corticoids. The simultaneous presence of both effects in Period G resulted in persistence of high plasma urate levels.

The low articular symptom index of Period G correlates with the return of the patient to almost normal health. Period G suggested that full suppressive doses of corticotropin and full continuous colchicinization actually exhibited additive therapeutic effects. Period H provided dramatic support for this view when oral colchicine was withdrawn for six days to permit a trial of n-methyl-colchicamid. On the first five days, there was no unusual articular activity. On the sixth day, 2-plus activity occurred for the first time in 100 days. Colchicine was resumed the next day but nevertheless there occurred polyarticular attacks involving five joints. These were of 3-plus grade for the next seven days and of 2-plus grade for still another eight days. Some years ago, from metabolic observations, it had been inferred that the effect of colchicine in gout is not mediated through the pituitary-adrenal system. The marked improvement when corticotropin was added to full colchicinization (Period G) and the precipitation of relapse by withdrawal of the colchicine although corticotropin was continued (Period H) also indicates that corticotropin and colchicine act on different mechanisms.

In all subsequent periods the patient was continued on full oral colchicinization; long-acting corticotropin dosage was adjusted so that articular symptoms were less intense than Grade 1, if this was possible. During prolonged corticotropin treatment gouty activity could be controlled very promptly because normal adrenal cortical responsiveness was present. The possible benefits of this prompt suppression of inflammatory activity are suggested by certain of the data in Table I. From Period A through Period H, the muscle mass estimated by the creatinine coefficient showed a steady decline but thereafter returned to normal. The twenty-four-hour creatinine clearance, a measure of glomerular filtration rate, showed a parallel pattern. The full extent of this anabolic effect is masked by the rise in the patient's weight. Actually the twenty-four-hour urine creatinine rose from 1900 mg. per day in Period H to 2690 mg. per day in Period P suggesting a 41.5 per cent increase in muscle mass! This is merely an additional example which shows that when corticoids successfully induce convalescence, the marked anabolic effects of convalescence may completely mask any catabolic effects (or anti-anabolic effects) of the steroids.

The remaining periods have been devoted to control of two additional aspects of the patient's disease. Probenecid was employed in 1 gram doses in Period M and in 2 gram doses in Periods I, K, and N in an attempt to restore a normal serum urate level and control tophi. Restoration of the normal urate level and of normal urate clearance actually was accomplished at the 2 gram level but not at the 1 gram level. While no new tophi appeared during the last five years of the study, old tophi did not disappear. The old tophi tended to become sore whenever Probenecid was withdrawn, and this low-grade discomfort was relieved when its use was resumed. Rather unexpectedly, the final figures suggested that the corticotropin requirement was decreased by 2 grams of Probenecid daily, but not by 1 gram each day. For the higher dosage, the average daily corticotropin requirements were 41.6, 33.9, and 23.5 units per day in three study periods. For periods during which only 1 gram per day or no Probenecid was given, the average daily corticotropin requirements were 39.4, 56.4, 55.8, and 59.4 units per day. The median value for the 2-gram Probenecid periods, 33.9 units per day, is only 60.5 per cent of the median value for the other periods, 56.1 units per day.

In the Periods from G through N, the daily corticotropin requirements had a median of 41.6 units per day (average deviation $\pm$ 10.7 units per day). We were somewhat concerned that this relatively high dosage might be partly responsible for the generally higher blood pressures being recorded, although certainly gout and obesity could well have provided a full explanation. Phenylbutazone was added in the hope that it might reduce the required corticotrophin dosage, and was given at a dose level averaging 330 mg./day in Period O and 200 mg./day in Period P. In both periods, the corticotropin dosages tend to be lower than in the preceding seven periods and that observed with the higher phenylbutazone dosages is only 47.5 per cent of the median value for the Periods from H through N. The metabolic data showed little evidence that phenylbutazone was importantly uricosuric; plasma urate was hardly 1 mg. per cent less than when only the colchicine-corticotropin combination was used.

Since phenylbutazone appeared chiefly to reduce corticotropin requirements while Probenecid normalized urate metabolism, it appeared interesting to add both agents to the basic regime of full colchicinization and suppressive corticotropin. Unlike salicylate, phenylbutazone did not interfere with the uricosuric effect of Probenecid. The quadruple colchicine-corticotropin-probenecid-phenylbutazone regime proved to represent highly gratifying therapy. Serum urate returned to within the normal range and the simultaneous clearance of urate and creatinine became almost normal. The annoying soreness about the old tophi was gone. Articular symptoms were as well suppressed as in any period except Period I. All medication was well tolerated and the desired reduction of corticotropin requirements was successfully accomplished. The corticotropin requirements for the last 500 days of treatment averaged only 20 units per day, a safe dosage since this patient tolerates twice this amount without severe hypocorticism.

Summary

A steady downhill course with progressively longer and more severe attacks, muscle atrophy, decreasing renal function, and finally the supervention of intractable continuous polycyclic acute gouty arthritis were the clinical events of the first

two-and-one-half years of this study. These difficulties arose at least in part from an unfavorable conjunction of three factors. (1) An unusually severe degree of gouty metabolic disturbance was suggested by unusually severe hyperuricemia and decreased renal urate clearance, unusually early appearance of tophi and unusually low urinary 17-ketosteroid coexisting with normal gonadal function, sperm counts, motility, and fertility. (2) Effective use of colchicine, the specific for acute gout, was impossible because hypersensitivity reduced daily tolerance by either oral or intravenous route to less than one-quarter that of an average patient. (3) It has been shown in a previous report that severe gout attacks are often terminated by increased spontaneous activity of the patient's pituitary-adrenal system. The existence of hypopituitarism-with-respect-to-corticotropin, an isolated pituitary defect, deprived this patient of this type of endocrine adaptive mechanism.

This inadequacy of conventional treatment led to study of the following experimental therapeutic maneuvers: continuous administration of oral or of intravenous colchicine carefully and continuously adjusted to current maximum tolerance; continuous full colchicinization together with continuous administration of corticotropin at fully suppressive dosage levels; this latter colchicine-corticotropin program supplemented by either Probenecid or by phenylbutazone; and, finally, the colchicine-corticotropin program supplemented by both Probenecid and phenylbutazone. The first two agents gave excellent control of articular manifestations, the Probenecid (2 gm./day) normalized urate metabolism and the phenylbutazone (400 mg./day) permitted a 60 per cent reduction in corticotropin dosage to levels clearly within the safe range.

These therapeutic trials required five years of study; they achieved the following concrete results: (1) The slight extra daily amount of colchicine which could be given by intravenous colchicinization terminated the polycyclic episode. (2) Hypersensitivity to colchicine was cured during the first brief course of corticotropin. (3) Severely disabling annual fall hay fever also responded well to corticotropin. (4) Two grams of Probenecid daily returned the serum concentration and renal clearance of urate approximately to normal. (5) Progressive renal impairment and muscle loss was halted and, to some extent, previous losses were recovered. (6) While existing tophi did not disappear, no new tophi formed and, if Probenecid was used, the old tophi were no longer irritable or painful. (7) Finally, the ominous prognosis given at the end of 1948 proved entirely incorrect. During the final five years of this study gout has not caused the patient to lose one day from work.

Acknowledgment

The contribution which was made to this study by Mr. Meyer Kurlansky of Chicago, its subject, was far greater than that of mere cooperation and, indeed, was instrumental in its success. The techniques of symptom evaluation and their reliability as relatively constant standards for many hundreds of days were largely Mr. Kurlansky's responsibility as was the manipulation of dosage essential for the determination of continuous colchicine tolerance and corticotropin requirement. Without his intelligent and delicate handling of these functions, the quantitative results could not have been reliable. Thanks are also extended to Dr. Irving M. Wolin for referring Mr. Kurlansky for treatment.

The corticotropin employed in this study largely was either Purified Corticotropin-Gel, Wilson, or H. P. Acthargel, Armour, donated through the co-operation of the manufacturers. Generous gifts of Probenecid and Phenylbutazone were kindly made available by Sharp and Dohme and by the Geigy Company, respectively.

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Rehabilitation in Arthritis

A Case Report

By William M. Jackson, M.D., John W. Sigler, M.D., Dwight C. Ensign, M.D., Joseph L. Fleming, M.D., and Charles Long, M.D.

Detroit, Michigan

A PATIENT disabled with arthritis is not only a candidate for organized care and therapy in a rehabilitation center but also should be the responsibility of every physician engaged in the practice of medicine. As physicians it must be our aim to prevent joint deformities whenever possible. This can only be accomplished by the early recognition of crippling disease and the immediate employment of proper therapy. It is far easier to prevent than to treat deformities, but it would be erroneous to say that all deformities can be prevented. At times joint deformity progresses in spite of all therapy, but fortunately this is rare. More commonly, disability and deformity are the result of neglect and inadequate therapy. The purpose of this paper is to present and discuss a few fundamental problems that confront the physician when a patient disabled by arthritis enters the office.

Of major consideration is the question as to whether everything possible is being done for the patient. This involves not only the treatment of the arthritis but also the care of the patient's general health. Other questions to be answered are: What is his financial reserve? Is he the wage earner? Are there small children demanding care? Is the patient so disabled that he cannot perform simple activities for self care? Is the patient young or old? Does the patient desire help or is he satisfied to remain disabled? Has he had previous treatment? If so, why did it fail? Has there been a well-planned scientific attack on the problem, or has the patient sought advice from ill-informed sources?

Most patients with arthritis are unusually grateful for any help they may receive. It is the responsibility of the physician to recognize the need for therapy in the disabled patient, and to plan his program carefully and enthusiastically. The case to be presented represents one of "mixed" arthritis, including elements of osteoarthritis, rheumatoid and traumatic types.

Case Report

E. H., a thirty-five-year-old white housewife and mother, was admitted to the Henry Ford Hospital on November 23, 1953, complaining of arthritis and inability to walk. The patient's joint complaints dated back to 1946. Over the next four years she had multiple intermittent joint pains. No swelling was present, but her symptoms generally grew worse over this time. From 1946 to 1950 her weight increased from 160 to 200 pounds. At this time she noted severe pain without swelling in the left hand. She consulted a physician and received ACTH and cortisone for one month by injection, with complete clearing of the symptoms. After cessation of the steroids, symptoms recurred.

In December, 1951, she sustained a right ankle fracture in an auto accident, developed osteomyelitis at the fracture site, and the right astragalus was removed. After this she was never able to walk without crutches. Four months later she developed crepitus, pain, swelling and later contractures of both knees. In September, 1952, she was admitted to another hospital for large doses of oral cortisone and again noted relief of pain. In the thirteen months before admission to our clinic she obtained cortisone without medical supervision in total oral dosages of 150 mg. or more per day. She stated that discontinuance of cortisone was promptly followed by return of joint pain and severe headaches. During this period her appetite was ravenous and she gained weight rapidly. For six months prior to admission she felt generally weak and was completely bedridden, and she developed rounding of the face, increased facial hair, easy bruising, dyspnea, leg edema and a dorsal fat hump.

On physical examination the positive findings included the following: She was a tremendously obese thirty-five-year-old white woman with a moon face, buffalo hump, malar flush and purple striae on the flanks and abdominal wall, lying completely helpless in bed. She weighed over 320 pounds. She was mentally depressed. There was 3-plus edema of the lower legs. The blood pressure was 150/90. Except for the musculoskeletal findings, the rest of the physical examination was normal. There was a suggestion of spindling in the proximal interphalangeal joints of the fingers, and there was difficulty in making a fist. The knees were very tender, somewhat warm, and there was thickened synovium bilaterally. The right knee flexed to 90 degrees and extended to 150 degrees (30 degrees flexion contracture), and the left flexed to 90 degrees and extended to 140 degrees (40 degrees flexion contracture). There was coarse crepitus in both knees. As a result of the old injury to the right ankle, there was no active dorsal or plantar flexion of the ankle. The right leg was 1 inch shorter than the left. The other joints were normal.

Aided by a grant from the Michigan Chapter, Arthritis and Rheumatism Foundation.

From the Divisions of Arthritis, Orthopedic Surgery, and Physical Medicine and Rehabilitation, Henry Ford Hospital, Detroit.

Initial Laboratory Data.—The hemoglobin was 13.1 grams, red cells 4.48 million, and white cells 7,000 with polymorphonuclears 80 per cent, eosinophils 3 per cent, and lymphocytes 17 per cent. Urine specific gravity was 1.025, and examination was negative for sugar, albumin or microscopic abnormalities. A Kline exclusion test was negative. The erythrocyte sedimentation rate was 25 mm. per hour with a hematocrit of 38 per cent. Serum sodium was 138 mEq/l., potassium 4.2 mEq/l., carbon dioxide 19.6 mEq/l., and chloride 101 mEq/l. A fasting blood sugar was 87 mg. per cent and the non-protein nitrogen 36 mg. per cent. A chest x-ray was normal.

X-rays showed marked narrowing of the joint spaces of both knees, with slight atrophy of the articulating bones, mild osteoporosis of all bones of the fingers, absence of the right astragalus and spotty osteoporosis of the bones of the right foot. No other bone or joint abnormalities were observed on x-ray.

Hospital Course.—The obesity, the Cushing's syndrome secondary to cortisone, the flexion contractures of the knees and the patient's disinclination to fight her disease were recognized as the most important problems. She was placed on a 1,000 calorie (later 700 calorie) diet, given multiple vitamin and potassium chloride supplements, and enteric-coated acetylsalicylic acid, grains 60 daily. She was withdrawn from steroids, using diminishing doses of oral cortisone. Corticotrophin gel was administered intermittently during this period. Although steroids were discontinued, she showed steady improvement. Her knees continued to be painful, but there were no objective signs of a flare-up of rheumatoid arthritis. The orthopedist's opinion initially was that skeletal traction was most promising in dealing with the flexion contractures of the knees, but because of the marked edema of the extremities, infection was feared. She received acidifying salts and mercurial diuretics without initial diminution of edema. Therefore, progressive wedging casts were used from December 18, 1953, to February 1, 1954, and it proved possible to achieve 175 degrees extension bilaterally. During this difficult period the patient not only complained of severe knee pain, but became quite disgruntled and unhappy. Physical and occupational therapy had been started during the second hospital week, but because of the casts and technical difficulties associated with her obesity and helplessness, little could be accomplished initially. She was seen twice during the wedging procedures by a psychiatric consultant. It was his opinion that her behavior represented an anxiety reaction of moderate intensity, and that she was a very dependent individual.

After the knee straightening had been accomplished, the patient began to take an interest in helping herself. Physical measures brought marked, though very slow, improvement. Despite her rigid diet, and gradual subsidence of the edema, weight loss was fairly slow though progressive. She at first received active resistance exercises to the upper extremities and to the knees. These were designed to strengthen her arms for crutch walking, and to increase knee motion without weight bearing. Later she graduated to parallel bar walking, and then to crutches. Plaster shells were used during sleeping hours to prevent recurrent contractures of the knees until quadiceps strength was improved. This was accomplished by May, 1954.

At that time she had an exacerbation of rheumatoid arthritis, especially in the upper extremities, whereas on admission her rheumatoid arthritis had appeared to be in partial remission. Because of severe pain in the hands and wrists, she was given paraffin baths to these segments daily with considerable improvement. This arthritic activity in her hands prolonged her hospitalization, hampered her crutch walking, and lessened her strength. Nevertheless a remission occurred, and thereafter her general improvement was steady. Because of the leg shortening, she was provided with a lift for the right foot and with orthopedic shoes. The ankle brace previously used following her auto accident proved satisfactory. From February, 1954, until the time of her discharge she received intra-articular injections of hydrocortisone in both knees from time to time, which afforded her good relief from pain and improved knee function. She was finally discharged on August 7, 1954, after 215 days' hospitalization. Her weight at the time of discharge was 172½ pounds.

Since then she has been seen at monthly intervals in the out-patient department. She is able to do her housework and able to walk without crutches although she uses them most of the time. She has needed intra-articular hydrocortisone in each knee about once a month. She is using paraffin baths and a regular active range of motion exercise program at home. She remains on daily salicylates, restricted diet, and dexedrine to curb her appetite. On her last visit she weighed 167 pounds. The gradual transformation of a helpless despondent mass into a functioning human being has more than justified the efforts of the many individuals who contributed to this accomplishment.

Discussion

In assessing this case, one notes that 215 days of hospitalization were required. Even on discharge she was still on crutches and had evidence of rheumatoid arthritis. Financially, this program would have been impossible without aid from the Arthritis and Rheumatism Foundation. On the other hand, this case was complicated by exogenous Cushing's syndrome and marked obesity. Probably most important in the patient's slow progress was her mental attitude and to some extent her home environment. Before admission she would have preferred to be pain-free, though bedridden, and she was rather indifferent toward caring for herself and living effectively in the face of some discomfort. It should be pointed out that this is fortunately quite opposite from the reaction of most severely disabled arthritic patients. In rehabilitation the physician must convince the patient that functional improvement is more im-

portant than completely relieving moderate discomfort. Pain in itself is disabling and should be relieved as far as possible. In this case the price of complete pain relief was invalidism.

Admitting the absence of curative therapy in most of the arthritides, in most cases there are available at this time rehabilitative measures which can do much to relieve suffering, improve function, correct deformities and return the patient to a nearly normal, useful and hopeful life. These divide themselves into three general, overlapping categories. These are the general medical care, the orthopedic measures which may be undertaken and the contributions of physical medicine.

The case presented illustrates the important role of the orthopedist in the rehabilitation of the arthritic patient. Many times plaster shells, leg cylinders, night splints, skin or bone traction, or wedge casts may be required depending on the deformity in question. At times corrective surgical procedures may be required in order that maximum function be obtained. When rehabilitative problems appear to require more than medical, physical or self-help measures, the consulting orthopedist can aid by deciding which orthopedic procedures will be helpful and safe. From his experience he can also predict when intervention should not be undertaken since ill-chosen methods may be useless or even harmful. Because practitioners of medicine will invariably encounter severely disabled arthritic patients, all physicians should have a working knowledge of the approach to such problems.*

The general medical care of arthritic patients entails initially a complete history and physical examination. Many times arthritic patients fall heir to other ills besetting mankind in addition to their arthritis. In addition to the arthritic evaluation, it is important to look for evidences of associated or coincidental disease, to carry out indicated diagnostic studies and to institute corrective therapy should abnormalities be found. In evaluating the arthritis, one must try to determine whether or not rheumatoid arthritis is present, its degree of activity and the amount of joint change. Most severely crippled arthritics will be of the rheumatoid type, but co-existing rheumatic disorders may be present and should be recognized. Extensive laboratory studies are not required in every patient, although basic blood count, sedimentation rate, urinalysis, chest x-ray and bone films are always desirable. When this evaluation is completed, the findings should be frankly discussed with the patient, and a general outline of therapy presented. Severely disabled arthritic patients know they have a serious disease and are usually more pessimistic than the situation warrants. A factual discussion is invariably better than their ignorant fears. At this time one must assess the patient's personality and his willingness to fight for rehabilitation and recovery. Although a cure cannot, and should not, be promised, one can usually be optimistic for some improvement of joint function.

Once the co-operation and confidence of the patient have been gained, the required therapy may be instituted. A detailed discussion of these measures is beyond the scope of this paper; however, medical care must include careful general therapy, educating the patient to his disease, and the judicious use of medications and procedures that are of proven benefit in rheumatic disorders.

*Several publications helpful to both physician and patient may be obtained by writing to the Arthritis and Rheumatism Foundation, 23 West 45th Street, New York, N. Y.

M.D. PLACEMENT BUREAU

Doctor Locations—To February 1, 1955

Placed by Michigan Health Council:	Opened Practice in	Approximate Date	Moved from
Thomas Campbell, M.D.	Kingsley	Nov. 26	Kenner, La.
Robert Hornbeck, M.D.	Atlanta	Jan. 1	Lewiston
Richard K. Meinke, M.D.	Morley (Temporary)	Feb. 1	Military Service
Assisted by Michigan Health Council:			
Robert E. Rowe, M.D.	Port Huron	Nov. 15	Detroit
William Compton, M.D.	Belleville	Aug. 20	Wyandotte
Frank W. Hedges, M.D.	Edmore	Aug. 25	——

Highlights of Meeting of American Rheumatism Association

By James J. Lightbody, M.D.
Detroit, Michigan

THE AMERICAN Rheumatism Association held its annual meeting in San Francisco, California, on June 18 and 19, 1954, preliminary to the annual meeting of the American Medical Association.

Dr. Edward W. Boland succeeded Dr. Charles Ragan as president of the ARA for the coming year. Two Detroit physicians were elected to membership in the ARA: Dr. Abraham Grant and Dr. Gennady G. Platoff.

Dr. Charley J. Smyth, who was medical director of Wayne County General Hospital for a number of years, and who now is associated with the University of Colorado, was chairman of the Program Committee for this year's meeting of the ARA. Dr. Ivan F. Duff of the University of Michigan Medical School assisted in the development of the scientific program which was presented to over 500 physicians interested in the specific problem of arthritis and allied diseases. There were thirty-two scientific papers presented over a period of two days, including a general discussion on "Hormones in Rheumatic Diseases," which was moderated by Dr. Richard H. Freyberg of New York City.

Dr. Joseph J. Bunim of Bethesda, Maryland, who is associated with the National Institute of Arthritis and Metabolic Diseases, presented a report on "The Rate of Disappearance from Plasma of Cortisone and Hydrocortisone." Both of these steroids were administered intravenously to normal subjects, and the rate of disappearance from plasma was determined. Studies of plasma obtained 100 minutes following infusion of hydrocortisone have shown that 90 per cent of the steroid assayed is identical with hydrocortisone. The mean biologic half-life for hydrocortisone in normals was found to be 115 minutes, whereas cortisone disappeared from plasma approximately twice as rapidly with a half-life of 65 minutes. Calculations of the volumes of distribution indicate that both steroids were distributed roughly throughout total body water. In patients with liver disease, hydrocortisone disappears from plasma at a rate up to four times slower than normal, whereas cortisone disappears at the normal rate. It may be that the ameliorating effect of jaundice on rheumatoid arthritis is related to the slow rate of metabolic transformation of the hydrocortisone normally elaborated by the adrenal cortex.

Dr. Morris Ziff of New York City reported on "Studies on the Metabolism of Adrenal Cortical Steroids in the Synovial Cavity in Rheumatoid Arthritis." Chromatographic analysis of post-injection synovial fluid shows substantial amounts of a number of metabolites of intra-articularly injected cortisone and hydrocortisone. Only trace amounts were found when the uninjected contralateral knee was aspirated at the same time, indicating local metabolism, since if metabolites had been formed recently, they would have returned in more nearly equivalent concentrations on each side. A different pattern of metabolism was found for each steroid. Cortisone yielded hydrocortisone, several other corticosteroids and an abundant noncosteroid component. These results raised the question of whether the unique anti-inflammatory effect of hydrocortisone in the synovial cavity may not reside in its transformation to a specific metabolic product.

Dr. Walter Bauer and associates, Boston, Massachusetts, analyzed "The Metabolic Effects of Long-Term Cortisone Therapy." Several patients with chronic, active, rheumatoid arthritis were studied over a period of years to determine the effect of prolonged administration of cortisone, and the results show that in these patients who were initially in negative nitrogen balance, prolonged administration of cortisone was associated with an increased and continued loss of nitrogen and other body constituents. Sudden increase in cortisone dosage and performance of surgery were primarily manifested by sodium retention rather than an added catabolic response. Although there was apparently no adrenal cortical response to surgery, evidence suggests that there may have been "increased" utilization of altered metabolism of adrenal steroids.

Dr. Philip S. Hench and his associates at the Mayo Clinic presented a paper on "Use of Cortisone in Prevention and Treatment of Surgical Stress in Hormonally Treated Rheumatoid Patients." They pointed out that patients treated with cortisone, hydrocortisone or corticotropin may re-

quire additional amounts of these hormones to withstand safely the effects of anesthesia, surgery, severe trauma, burns, or other stressful situations. When significant amounts of cortisone or related hormones have been administered within three months of surgery or other severe stress, there is benefit derived from a preoperative schedule or adequate amounts of cortisone to combat the stress reaction. When available, preparations of hydrocortisone for administration intraveneously during or following surgery may be used if other preoperative preparation is not possible. Very careful observation of the patient's reaction to the anesthesia and other stress is essential in any instance where the patient has received cortisone or related hormones. Employment of the principles of preoperative preparation with cortisone and related hormones has eliminated fatalities from postoperative adrenocortical insufficiency.

Dr. Charles L. Short and his associates in Boston presented detailed information obtained from eighty rheumatoid arthritic patients picked from a consecutive admissions group of 293 rheumatoid arthritic patients. These eighty patients (27 per cent of total number admitted) experienced one or more remissions while under observation, while the remainder (73 percent) of the group were essentially progressive. The remissions occurred throughout the year with a peak in May, but exacerbations started more frequently in the colder months, a distribution corresponding to the available figures for the season of onset of rheumatoid arthritis. The rheumatoid arthritic patient is therefore more likely to experience either a serious setback in his disease or the actual onset of his arthritis in the colder months of the year. It has been assumed that climatic changes are probably responsible.

The subject of "Pathological Fractures During Cortisone and Corticotropin Therapy" was discussed by Dr. Charles H. Herndon and his associates from Cleveland, Ohio. Severe osteoporosis with pathological fractures is a recognized hazard of prolonged treatment with cortisone, and the precise role of cortisone or corticotropin in the genesis of the fractures can not be determined. Cortisone, phosphorous and nitrogen excretion are known to be increased during cortisone and corticotropin administration, during immobilization and during the course of active rheumatoid arthritis. All of these factors were present in the patients presented, but it is reasonable to assume that hormone treatment was mainly responsible for the pathological fractures.

Dr. Ivan F. Duff and Dr. William D. Robinson of the University of Michigan presented a paper on the "Clinical and Laboratory Effect of Long-Term Intra-Articular Hydrocortisone in Rheumatoid Arthritis." Over a three-year period there were 1,020 serial injections of hydrocortisone made into 105 rheumatoid joints. In fifty-three joints (50 per cent) worthwhile benefit was achieved. In fifteen other joints benefit was prolonged for seventeen to thirty-four days before repeat injection was required. Upon discontinuation of therapy, benefit has persisted from four to twelve months in 19 per cent of all treated joints. Treatment of thirty-two joints (31 per cent) was eventually discontinued because partial initial benefit could not be further improved. In twenty joints (19 per cent) there was no clinical response to hydrocortisone. Ten patients refused repeated injections because of discomfort or failure to achieve worthwhile benefit. Synovial fluid studies were made repeatedly on thirty-five knees, and it was found that hydrocortisone may produce remarkable alterations towards normal in joint fluid. These changes generally parallel the clinical effect, but dissociation was apparent in 29 per cent. Maintenance of joint fluid improvement was usually dependent upon repeated steroid injections.

Dr. Sydney Cobb and his associates of Pittsburgh reported a critical survey of the problem of classification in the field of arthritis. It was pointed out that data obtained by arthritis surveys have usually been unsatisfactory because they have been neither precise nor disease specific. A town of about 10,000 persons in 3,000 families had been selected for a household survey of arthritis. It was found that persons with rheumatic symptoms far outnumber those fitting a classical disease description. The majority of these people had not consulted a physician for these symptoms, which suggested a somewhat different population sample from that observed in clinical practice. Many illustrative patients were shown to emphasize the difficulty in deciding when an atypical case is too atypical to be included in specific classification categories. There is an urgent need for limiting definitions in diagnosis of arthritic diseases so that future attempts in epidemiologic surveys would be more accurate and acceptable.

Postprandial Symptoms Following Gastrectomy

By H. Marvin Pollard, M.D.

Ann Arbor, Michigan

RECENTLY, after his partial gastrectomy, a patient made the following comment: "Once I had pain when my stomach was empty. Now, I get a pain when it's full."[1]

Within the past week, I saw a patient who had a subtotal gastrectomy five years ago. I quizzed her diligently regarding the possibility of manifestations of weakness, perspiration, nausea, and palpitation, all of which she emphatically denied. According to her statement she had an excellent response from her operation. As she started to leave the room, she turned to me and said, "I almost forgot to ask you. Why is it that on several occasions recently I have collapsed near the end of a meal?" I mention this point merely to emphasize that even on careful questioning it is sometimes difficult to elicit the symptoms about which we are concerned in these individuals. In this patient's case, she merely did not relate her manifestations of a "dumping syndrome" with her subtotal resection.

Postprandial symptoms following gastric surgery can be segregated as follows:

1. Symptoms due to recurrent ulceration.
2. Symptoms due to mechanical causes.
3. Symptoms due to alteration in the normal physiology of digestion.[3]

The incidence of all postgastrectomy symptoms, regardless of the source, varies from zero to 65 per cent. If we are concerned only with the more profound manifestations, the usual quoted incidence is around ten to eleven per cent. If we include in the grouping symptoms of a lesser degree, then in carefully studied groups the incidence may reach as high as 60 to 65 per cent. I have talked to surgeons who have indicated that in all of their patients with a subtotal gastrectomy or gastroenterostomy, with or without vagotomy, they have never seen a single incidence of any complication. I have talked to others who have seen all varieties of complications from hemorrhage on through the list, including nutritional complications, as well as mechanical complications and hypoglycemia. It is not my intention to give the impression that all patients with gastric surgery have complications. It is my purpose merely to evaluate the various complications that may occur, in the hope that we can outline a suitable form of therapy for each particular complication and improve the patient's condition. Certainly, where complications arise in the handling of ulcer patients and such complications are subject to justifiable surgery, we as internists are all relieved to know that corrective procedures are available to us by the surgeon. In most situations, however, it eventually becomes the problem of the internist to handle these patients in the late postoperative period.

I am not referring particularly to the symptoms which occur within the first three months after gastric surgery, inasmuch as there are a variety of symptoms which may arise and which disappear in that period of time never to return. I am concerned more with the patients whose complications appear at least three months after the gastric surgery.

Symptoms Due to Recurrent Ulceration

Symptoms arising from a marginal or jejunal ulcer correspond closely to the average typical duodenal ulcer history. It may be somewhat more variable, but these patients usually obtain relief by food or soda, although the location of the discomfort is more widespread and frequently is to the left of the mid-line or above the level of the midline, midway between the umbilicus and the xyphoid process. The recurrence rate following gastrectomy for duodenal ulcer from most reports averages around eight to ten per cent. The recurrence rate for gastrectomy for gastric ulcer is appreciably smaller and varies from zero to 7.5 per cent.

Symptoms Due to Mechanical Causes

1. *Afferent loop stasis and the afferent loop syndrome.*—Typically the particular symptoms described to this complication consist of a bitter taste in the mouth occurring within a few minutes up to an hour following ingestion of a meal. Soon thereafter there may be regurgitation of about a mouthful of bile after the meal or small intermittent regurgitations of bile following indulgence in extra large or rich meals. The term here implies, of course, entry of food into the afferent loop and

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subsequent stasis. This sequence by itself is almost pathognomonic of afferent loop stasis. If these symptoms persist after the three-month period then the true afferent loop syndrome has probably become permanently established. If, however, the pancreatic and biliary secretions remained dammed up for a day or days, the patient may complain of almost continuous epigastric pain or discomfort with a constant feeling of fullness, nausea, and anorexia. One interesting feature of this complication is that it is most commonly found after gastrectomy and seldom found after a gastroenterostomy. Wells and McPhee[5] maintain that this complication will occur in 18 per cent of patients following gastrectomy.

2. *Efferent loop obstruction.*—This condition, when present, gives rise to a sensation of fullness, nausea and food vomitus as distinct from bilious regurgitation. According to Pulvertoft, it is caused by adhesions between the first few inches of the efferent loop and the hilum of the spleen. These adhesions gradually contract and draw up the efferent loop, so that kinking near the stoma results. At the same time, the jejunal wall near the stoma distends. There are occasional instances where these mechanical causes may be suspected from the patient's symptoms, but where even after re-exploration no difficulty is found whatsoever. In time these symptoms usually become less pronounced and the patient is able to go on about his normal responsibilities.

Symptoms Due to Alteration in the Normal Physiology of Digestion

There have been a number of interesting and valuable studies conducted to explain what is commonly spoken of as the early "dumping syndrome," which has its onset either during the meal or shortly after the meal, usually within ten to thirty minutes. These symptoms frequently persist for thirty to sixty minutes and in some instances even longer. Manifestations of the late "dumping syndrome" usually occur two to three hours after a meal.

Many hypotheses have been developed with evidence to support them as an explanation of these various symptoms. Wells and Welbourn[6] attribute the early "dumping syndrome" symptoms to the removal of the secretory function of the stomach and the entry of hypertonic solutions into the small intestine which results in increased bowel activity. The main feature of this situation, therefore, is increased jejunal activity or as Machella[2] has emphasized, a distention of the jejunum. A distended balloon inserted into the jejunum, interestingly enough, will give rise to similar symptoms. These patients may experience sweating, tightness or pain in the epigastrium, nausea, weakness, palpitation, feeling of warmth, vertigo and even collapse. Such symptoms may not necessarily occur after every meal, but only after certain meals and in varying severity. The "dumping syndrome" has also been reproduced in control subjects by intrajejunal installation of hypertonic solutions of glucose, protein hydrolysate, and sodium sulfate. Excessive sympathetic stimulation due to retraction of the jejunal loop by the weight of food in the gastric remnant on the efferent and afferent enterostomy loops, likewise, must be an explanation of some of the immediate effects. Similar symptoms may be produced by vagotomy-sympathetic imbalance produced by the sudden entrance of food into the jejunum.

1. *Hypoglycemia.*—Hypoglycemia has been found by various individuals to be distinctly correlated with the onset of symptoms mentioned above. We took occasion to study a group of individuals operated upon in our hospital, using the technique of gastroenterostomy and vagotomy for the surgical management of duodenal ulcer. At least one-third of our patients so tested, utilizing a preparatory diet of 300 grams of carbohydyrate for three days, as proposed by Conn, and followed by the customary five-hour glucose tolerance curve, showed blood sugar levels going below 40 mg. per cent. In most instances at the time the blood sugar level reached the low point, the patient experienced the symptoms of hypoglycemia. Interestingly enough, in a few instances, the patient did not complain of any particular symptoms at the time of this extremely low blood sugar level. It is possible to have a low blood sugar in the immediate period following a meal, but most commonly this is the explanation of symptoms occurring in the late period, two to four hours following a meal.

The size of the stoma has, of course, been implicated as a possible source of complications, as well as jejunitis, the emptying of hypertonic solutions into the small intestine resulting in increased bowel activity, and more recently Smith[7] showed that there is an abnormal fall in serum potassium in some of these individuals post-gastrectomy.

2. *Nutritional Complications.*—Imbalance in the digestion and absorption of food, particularly of fat, has been observed repeatedly in both man and animals after a gastric operation. As emphasized by Welbourn, Hollenbeck, and Bollman,[4] steatorrhea may contribute to a state of severe malnutrition after gastric resection in man.

The mechanism of the imbalance has not been adequately explained and few studies have been made comparing the effects of the different operations. It has been shown, however, that in some individuals, particularly after gastric resection, there is an excessive amount of fecal fat and fecal nitrogen, even though the digestion of protein and carbohydrates is seldom seriously disturbed. Impaired absorption has been found in patients who have symptoms of hyperactivity of the small bowel after operation. In dogs, vagotomy performed three years previously did not affect the loss of fecal fat. Gastroenterostomy had no effect on loss of fat and, interestingly enough, loss of weight after gastrectomy seemed to be caused more by inadequate intake of food than by excessive loss of fat.

We have seen individuals following gastrectomy develop nutritional anemia, anemia of blood loss, anemia of iron deficiency, reduction of total serum protein with a reversal of the A/G ratio, even to the point of developing extensive ankle edema. These complications are not common, but are difficult to correct, inasmuch as the administration of pancreatic enzymes, bile, emulsifiers, and highly emulsified refined fats have not proven particularly beneficial, principally because the patient does not have the appetite for them.

3. *Other Complications.*—Bleeding episodes are recorded in as high as one-third of the cases of post-gastrectomy problems and perforation in approximately ten per cent. In our own experience with gastrectomy in these post-operative stomachs, almost invariably these patients have an extensive degree of gastritis. This must account for some of their inability to eat properly.

Medical Management of Postprandial Distress Symptoms

Needless to say, the extensiveness of the medical management depends entirely on the severity of symptoms. The majority of individuals will need nothing more than reassurance and encouragement. In patients, however, who have troublesome symptoms, the following program is proposed:

1. That they be placed on six moderate sized feedings per day.

2. That the diet be limited to approximately 100 grams of carbohydrates, 120 grams protein, and an average amount of fat.

3. Limiting the amount of liquid consumed with the meal may be of some assistance.

4. Urging the patient to recline in a horizontal position following a troublesome meal may either prevent the course of distress or aid in its elimination.

5. Preparations exerting antispasmotic activity, as well as blocking agents and sedation are of distinct benefit.

In summary, it is my belief that the post-prandial symptoms following any type of gastric surgery may vary greatly. When the symptoms do occur, they may prove quite distressing to the patient. A careful understanding as to the exact nature of the symptoms in a particular patient is important to evaluate, since it decides the proper form of treatment to be followed. Much can be done for these patients to relieve them of their distress.

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The Medical History in a Periodic Health Evaluation

By Warren B. Cooksey, M.D.

Detroit, Michigan

UNLESS one is unusually systematic and painstaking in recording the medical history as a part of the periodic health examination, it will become perfunctory and of too little value. Also, the examiner's attitude toward the examination can modify especially the medical history in such an examination. This "attitude" is of such importance that one may render by far the greatest service in these examinations when a special day or period of the day is set aside to do these periodic health evaluations. In this way a more complete concentration on the task is possible and if telephone calls and other distractions can be avoided, it is better still.

It is usually best to use a printed form for the taking of these histories and for recording the physical findings. By following such a guide no detail concerning the head, eyes, ears, nose, throat, sinuses, etc., will be slighted. This detailed questioning is important because these patients do not usually come to you with the idea of complaining, but only because their company or their wife has arranged it or they themselves think it is a good thing. Old patients in one's file, more than any other, are often treated too lightly in the periodic "check-up" and here especially it is wise to start with a totally new history sheet and question them as if they had never been seen before.

This task is a sleuthing job of the highest order and a challenge to ferret out, by every device possible, the slightest hint of emotional or physical stress that can be the harbinger of serious trouble to come. The finest medical teachers of all time always assess to the medical history a place of prime importance, and it hardly needs repeating that many important diagnoses are made entirely on the medical history. Unfortunately, however, it is frequently true that in a busy practitioner's office too little time indeed is devoted to history taking. The Periodic Health Evaluation examination is clearly becoming more and more popular among both laymen and the profession. If it is to contribute significantly as a measure in preventive medicine, it must be conducted as systematically and thoroughly as we know how to do it and a basic principle is the carefully taken history.

62 Kirby Avenue West, Detroit 2

Foreign Trained Medical Students

Foreign-trained medical students entering the United States may soon outnumber graduates from American medical schools.

Dean A. C. Furstenberg of the University of Michigan Medical School estimated, at the annual Congress of Medical Education and Licensure in Chicago, February 8, 1955, that the United States may have between 5,000 and 10,000 foreign medical men seeking opportunity to practice medicine in North America in 1955. And, he said, this number is increasing every year.

United States medical schools presently graduate between 6,000 and 7,000 students annually.

Dr. Furstenberg raised the question in his talk, "What is to be done with the foreign-trained medical student?" He added, "Here we have a real challenge shared alike and unavoidably by our medical schools and the State Boards of Registration in Medicine."

The Dean also said, "With world tensions what they are today and gallant efforts on our part to allay them and to establish peace on earth, we must formulate a policy based on an honest, factual, non-emotional approach to this issue."

He declared that no United States medical school seeks to discriminate unfairly against the foreign-trained doctor. But he also said reports from educators who have visited foreign schools are for the most part unfavorable, and often show that these foreign schools are inferior to the curricula of schools of this country.

In fact, declared Dean Furstenberg, there is general agreement that the vast majority of foreign graduates in medicine are "no match intellectually" for the young graduates from American schools.

Dr. Furstenberg also said that entering foreign-trained doctors are "in most instances so inferior that they constitute a definite obstacle to the progress of American classmates with whom they are associated."

One of the problems which both the foreign-trained student and his American medical professor face is the English language. Said the Dean, "Many of these doctors try to translate the lectures, seminar, and conference transactions into their native tongue but cannot do it rapidly enough to comprehend the subject."

Dean Furstenberg made the following recommendations:

1. Set up screening boards which would give oral examinations to the foreign educated doctor.

2. Passing such an examination, the doctor would qualify for formal examination by the State Board of Registration.

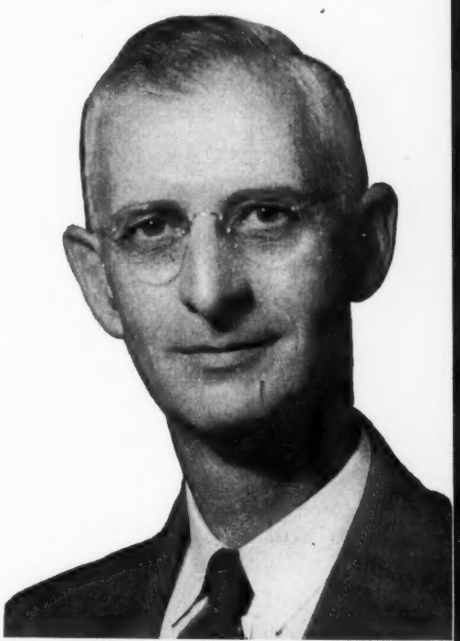
3. Rejected candidates would take a minimum of one year in a basic science course in a class-A medical school.

4. The candidate would then be re-examined by the Screening Board.

Said Dean Furstenberg, "It should be incumbent upon the foreign doctor to accept our philosophy of education, acquire the knowledge essential to medical practice, and meet our standards of competence if he is to be granted the privilege of practicing medicine in the United States."

A Challenge to Clear Thinking

President's Message



Now is the time to stand up and be counted.

Are you in the practice of medicine to be of service to others, or only for your personal gain?

Just what do today's standards for the control and betterment of medical practice mean to you?

Have you supported the improvement in standards of hospitals, the regulations by hospital staffs and the advancement of better quality medical care?

Just what do your medical degree and license to practice in Michigan entitle you to do?

Don't worry about the answers to these questions. You soon may revert to the level of medical practice that was the pattern in Michigan in 1898. Your State Medical Society is now a defendant in a court of law, and if this case is decided against us, as in the recent Michigan Supreme Court decision on the Grand View Hospital case, the answer is plain. All our progress shall have been in vain.

Read carefully the editorials in this issue of THE JOURNAL. They tell a story of fact and prophecy. If your thinking follows the pattern of the Supreme Court, then the progress of a half century has been lost.

Robert H. Baker

President, Michigan State Medical Society

Editorial

MISERY LOVES COMPANY

ALMOST every day there is announced another "cure" for arthritis, and practically every issue of the popular magazines and periodicals gives a preliminary report on some new miracle drug that Dr. So-and-So and his co-workers have reported at a recent medical meeting.

Even before the majority of practicing physicians have heard that there is such a "miracle," the patients bring in the glowing reports which they have read in these magazines and newspapers concerning these new treatments; and many patients bring the articles in to their own physician, place them on his desk and say—"Give me some of that stuff, Doc—quick!"

The average physician has enough difficulty trying to keep up on his reading of regular medical journals without trying to thumb through all the pages of the numerous pocket-size publications that contain easy-reading articles on revolutionary treatments for all types of diseases.

Patients with arthritis are constantly on the alert for new miracle drugs, and they fall prey to the type of advertising which promises them relief from all their aches and pains. Books written by so-called Science writers, medical technicians and others trying to get into the act, are offered to the public, enclosing promises of cures by various types of diets and medications. Recently an individual with no medical education of any kind was allowed to appear on television and, with the support of several of his so-called "patients" who gave verbal testimonials, he was permitted to inject his false theories of therapy into thousands of homes. There does not appear to be any reasonable means of controlling false advertising on radio, television, or in the public press, relative to ridiculous types of treatment and management of disease states. The poor arthritic buys anything and everything that anyone tells him to buy and is greatly affected by the things he hears and reads. He is under the impression that statements made in the public press and over the radio and television are absolutely factual and truthful.

Unfortunately, most arthritics are still looking for a miracle drug—but there is no such thing as a miracle—in the treatment of arthritis. It is a long, hard, weary road that both patient and physician must travel—but the patient should be told at the beginning of a program of treatment, that the biggest job is to be done by the patient—not by the physician. The psychosomatic aspect of treatment, or the effect of the mind on body functions, is never more demonstrable than it is in the field of arthritis. The prevention of deformities and the maintenance of function of the extremities is primarily in the hands of the patient, after proper education of the patient by the physician relative to types of exercises. Various medications only assist in the program of rehabilitation.

By putting the major part of the responsibility for improvement on the patient himself—the physician makes the patient more self-reliant—so that when improvement of function does appear, the physician will be able to say to the patient, "Look what a wonderful job you have done for yourself!" Let us concentrate on what the patient can do for himself—not on what we can do for the patient. When we deal in arthritis, we are dealing in months and years—not days or weeks. It is a long-term period of observation—and tries the patience of both the physician and the arthritic.

J. J. LIGHTBODY, M.D.

MICHIGAN DEPARTMENT OF SOCIAL WELFARE

BECAUSE of the multitudinous blanks and the unsatisfactory relations with the recipients of public assistance, the House of Delegates of the Michigan State Medical Society at its session in Detroit, September, 1953, passed a resolution asking for a committee to study the problem and report. The Council appointed such a committee which met with the medical advisory committee of the Michigan Department of Social Welfare, surveyed the whole problem, and made a report to the Council. This subject had been under study

for years and progress has been made toward a solution. The Advisory Committee was first appointed at request of the Commission by the MSMS Council. On another page, an analysis of the program for assistance is published with an explanation of the forms necessary, and a hint as to a method of making the work simpler and assuring the doctor of more systematic payments from these people. Much of the complaint comes from misunderstanding. We hope our members will read the article carefully. One item not included is the necessity of making the medical reports sufficiently inclusive so that the medical consultant may have a clear picture to determine the amount and duration of illness. He has to approve the allotments.

A BIT OF HISTORY

TOWARD the close of the nineteenth century, and early in the twentieth, most of the states of the Union, at the request of the medical profession, exercised their police power by establishing State Boards of Registration in Medicine. In that wildcat era, anyone could practice if he chose to call himself a doctor. Now it is necessary to attain a degree of education and pass an examination for a license. Soon after the turn of the century, the Carnegie Foundation raised the question of the quality of education available in the medical schools, and after extensive examinations on campus issued a rating—Flexner report. Many schools were closed and others vastly improved. That was a great step in medical practice and promised that all practitioners would at least be adequately trained.

Soon the specialties developed, and the question of proper training for the very special services offered to the patients was another problem. In the early "teens" the American College of Surgeons came into being for the published purpose of improving the quality of surgery by requiring certain postgraduate studies before being accepted as a surgeon. The vicious practice of "fee-splitting" was to be suppressed; members were required to pledge not to engage in the practice. The AMA had long before established a so-called "Code of Ethics" which, among other attempts to impose good morals, included the fee splitting, and the promise not to attempt services beyond the abilities of the person himself.

In the late teens and the twenties, the ophthalmologists and the otolaryngologists established the first two Specialty Boards in another attempt to guarantee to the public and the profession that those who were rendering special services had adequate education and training. There are now nineteen of these American Boards representing that many departments of medical practice, every one with the hope of establishing and controlling moral and educative standards by the simple process of exercising some form of control over the doctor in his practice. During this same time, the hospitals of the nation, by action of their medical staffs, have accepted these provisions and required their practitioners to meet the established standards set by the doctors themselves. The hospitals came into line because, in the process of guaranteeing good care to the suffering patients, the AMA and the ACS began approving the hospitals. Loss of such approval became a serious consideration, and most staffs co-operated.

Thus has the medical profession for a half century improved itself and its members and hospitals until now the best medical service anywhere in the world is available. It has been a case of self policing. The public, in the name of the state, had not even attempted regulation other than licensing.

A VITAL COURT DECISION

FOR SEVERAL years, a case has been pending in the Gogebic County Circuit Court and ultimately reached the Michigan State Supreme Court regarding the rights of a licensed doctor of medicine to practice in Grand View (Gogebic County) Hospital organized under Act 350 of Public Acts of 1913. For infraction of rules (there were thirty-three) the doctor, Samuel G. Albert, M.D., had been barred from practice in the hospital. Several of his patients were refused admission, unless under some other staff member, and he was not allowed to operate, unless under supervision of a senior staff member.

The trial court found and the Supreme Court sustained that:

(15) "The defendant board of trustees has no power, by rule, regulation or otherwise, to regulate the practice of medicine and surgery in Grand View Hospital."

(16) "Articles V, VI, VII, XVI, XVII, XVIII, XXVII, XXVIII, XXIX, and XXXIII of the 1950 rules and regulations of the defendant board of trustees, as placed in effect November 1, 1950, do so attempt to regulate the practice of medicine and surgery in Grand

View Hospital, and consequently they are void and of no effect and the same are hereby set aside."

(17) "All lawful power to discipline any duly licensed physician and surgeon, or to suspend or revoke his right to practice in any public hospital organized and existing under P.A. 1913, No. 350, as amended, is exclusively committed to the state board of registration in Medicine and is accordingly determinable by and in pursuance of the medical practice act, and Article XXXIII of said 1950 rules is accordingly void as an attempted usurpation of powers, duties and procedures set forth in the medical practice act, and the same is hereby set aside."

Article XXXIII of the 1950 rules reads:

"The board of trustees reserves the right to remove any member of the medical staff or to deprive any physician or surgeon of the privileges of the hospital whenever, in their sole judgment, the good of the hospital or of the patients therein demand it; by amendment, addition, substitution, repeal or revision, as in its judgment may seem for the best interest of the hospital and those who are to became patients therein."

Thus the Supreme Court of the State of Michigan has decided that in hospitals organized under this particular Act (P.A. 1913, No. 350), the trustees of such hospitals are not authorized to have supervision of the qualifications, or preparation of any registered doctor. He may demand entrance and do any surgery or treatment he chooses. This involves the police power of the state which has not been delegated to such trustees.

Very few doctors remember the condition of medical practice before the enactment of our Medical Practice Act in 1899, but prior to that time, anyone could practice medicine, and he did not have to have a medical degree. That Act was adopted at the request of the medical profession and did establish some specific police power. As years have passed, the medical profession has voluntarily established some self-imposed controls in an effort to give the best possible service and protect the people from inexperienced and incompetent physicians. We have formed the National Boards and set standards of preparation and experience. These appear under the foregoing decision to be unenforcable in hospitals under Act 350. Any rogue or incompetent person who is registered may do anything. Many criteria have been set up to supervise preparation and training of those to whom the people turn for the treatment of illness.

It would seem that the Supreme Court has definitely reserved all police power in regard to the practice of medicine to the State Board of Registration in Medicine, which is totally unprepared and unable to establish or exercise the supervision of standards which the profession has voluntarily followed.

Here is reassertion of police power.

THE FOOT IN THE DOOR

THE ENTIRE Supreme Court of the State of Michigan, in their decision on November 30, 1954, involving certain phases of the law, limited themselves to the questions before them but hinted that other rulings might and could be made, and remanded the case back to the circuit court for further consideration by the plaintiff, if desired.

The broad inference is definite: once a doctor of medicine is registered by the Board of Registration in Medicine, no board, person, or persons may make rules, or regulations, limiting, controlling or suspending his right to practice medicine or surgery in all its branches, except by statutory authority. This is a lengthy opinion written by Mr. Justice Reid. We have boiled it down to a specific statement.

Although the decision was based on Act 350, P.A. 1913, then under consideration, we see the danger of extending it to other hospitals, voluntary, religious or state. If all such police power has been delegated to the State Board of Registration in Medicine in one hospital what is to prevent the same application to rules made in any other?

Under the law of the State of Michigan as it is *now* interpreted, any person who is registered may go into certain hospitals, *and conceivably it might be any hospital,* even the University of Michigan hospitals, and not only demand entrance for consultation on a patient, but to perform any treatment or surgery he chooses.

Carried to its logical conclusion, this rule may be intolerable to the people of the state for whom the medical profession has established many self-imposed, completely voluntary protective rules.

ONE REASSURING FEATURE

DURING the years, the profession has been the target of thousands of critical items in the press, the magazines, and the platform, enumerating the failures of the practice because a few of the members have fallen by the wayside in their moral obligations. A survey last year by the editors of *Look* magazine showed that of the

articles published about the medical profession, 6 per cent were unfriendly and critical. Many have asked, "Why does not the medical profession or the AMA do something about it." Every one of us has heard that same question, if he has been alert to the problems.

We now have the answer, which we all knew but tried manfully to by-pass. In the case of Albert et al. vs. Board of Trustees of Gogebic County Public Hospital, on appeal, the Supreme Court of Michigan told us flatly that no one but the Board of Registration in Medicine may exercise any limitations or control over the practice of any licentiate of that board. This decision was applied to hospitals under the 1913 Act No. 350, but if applied there it can also be applied in other hospitals and circumstances. The State Board has the police power of the state, provided by law, and there is no other policing of the practice of medicine other than the established criminal law.

So far as this editor is concerned, we regret the action of the court. We are now completely and involuntarily relieved of our responsibility as "our brother's keeper." Now, when we are asked why the medical society doesn't do something about it, the answer is, "The Michigan Supreme Court says we cannot."

FEDERAL POLICE POWER

A FEW years ago the Federal Government brought suit against the Oregon State Medical Society for "Conspiracy in Restraint of Trade." This grew out of the voluntary non-profit health plans. There was a long trial, and a verdict that the government had not established its case. In California, there has been much trouble, many threats, and much fear of a trial on the conspiracy charge. Other states have had the threat, and their books looked over. The AMA had the government officials "looking" for several weeks.

Recently, a threat has been made of a charge of "conspiracy" in that the medical profession has so arranged the hospital practice that only a member of the society may have hospital privileges; so that it is necessary to be a member of the society to buy malpractice insurance; also only members may take the examinations of the various National Boards; that the stamp of approval of drugs and appliances is in the nature of a monopoly; that the stamp of approval for voluntary health service plans is available only to medically supported plans. It was intimated that a trip to Washington might obviate the need of a trial, the complaint might be adjudicated and the errors corrected—the old "Consent Decree."

Every one of these charges involved the police power. We heard an attorney arguing heatedly that the medical profession has set up a police system which it has no right to do. The police power rests justly only in the state. If we wish to exercise police power over our members, we should get a legally authorized agency of the state to set up these standards. They only can enforce them. We did not agree, but think we see the next approach toward the complete socialization of medicine. The Michigan Supreme Court has pointed the way. The federal officers (held over from the old regime) are now making the threat. Are we to be punished for trying to provide as best we can with our limited power, for the most expert and finest care possible for our patients?

NOTE.—Two weeks after these editorials were prepared a Dr. Kopprasch of Allegan (unable to find him in the AMA Directory) brought suit against the Allegan Health Center, its trustees by name, its medical staff by name, the Allegan County Medical Society, the Michigan Hospital Association, and the Michigan State Medical Society, alleging that they were preventing him from practicing medicine, refused to allow him in their hospital, and had hurt his reputation, and he asked for damages of $250,000.00.

THANK YOU

TO John G. Bielawski, M.D., of Detroit, goes our appreciation for the fine efforts on our behalf during the past several years and for his excellent co-operation in the preparation of the material for the Heart Number of THE JOURNAL published in January.

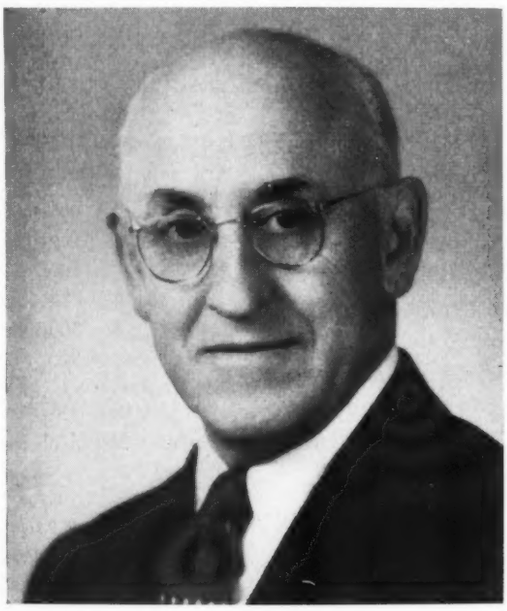
We wish to express our sincere thanks to Palmer Sutton, M.D., of Royal Oak, for his efforts in bringing up to date the work of the Maternal Health Committee, and in the preparation and assembling of material for the memorial issue of THE JOURNAL, published in February.

Equal thanks and appreciation are extended to John J. Lightbody, M.D., Detroit, for his ready assistance in compiling papers for the Arthritis and Rheumatism Number of THE JOURNAL comprising the present issue.

William A. Hudson, M.D.

The Trail from the Ozarks to Lisbon

William Andrew Hudson, M.D., a Detroit chest surgeon of international renown, is one of Michigan's most honored world travelers. The Spanish and Portuguese speaking countries to our south, the polylingual countries of Europe vie with one another for his scientific papers and his after-dinner speeches. The dignity, weight, and eloquence of his scientific words manifest his life-long pioneering in chest surgery, and his droll humor reflects his Ozark heritage and chief avocation—farming.



The sequence of events of his boyhood life, the struggle in his rise to medical fame, and more particularly the pinnacle of his career—the Presidency of the American College of Chest Physicians—is an episode of "This is Your Life" caliber. Indeed, it is a modern Horatio Alger story.

Will, as Ralph Edwards would certainly call him, was born February 23, 1891, in Jasper, Arkansas, the Newton County metropolis with a population today of a very little more than 400. Jasper rests snugly in the picturesque Ozark Hills. It is in the Mystic Cavern region, near the Diamond Cave area, and only a short distance from Harold Bell Wright's "Shepherd of the Hills" country. The country is rugged; some of the winding old trails follow the tributaries of the Osage River which has sculptured and carved its way through the limestone and well-wooded hills to reach its level beside bounteous cornfields; while other trails lead ever upward until, as Harold Bell Wright so aptly phrases it—"They reach the higher sunlit fields where those who journey see afar and light lingers even when the sun is down."

It was in these cornfields on the lower trail that Will Hudson as a boy—the boy with a hoe, the boy with a cultivator—had his boyish dreams; dreams and hope for the higher trail "where those who journey see afar," and his medium for attainment of these dreams, he will tell you proudly, was "corn." Corn in Arkansas, as in Egypt, was and is an expression for "plenty" and Will used corn as a commodity for his education.

In the way of a sketchy and spotty biography, Will Hudson attended the public school in Newton County, Arkansas. Following his graduation from high school at Sedalia, Missouri, he entered Washington University at St. Louis, and for financial assistance he taught grade school in Newton County and later in State Teacher's Normal in Emporia. In 1918, he received his Bachelor of Science degree and in 1920 his Doctor of Medicine, followed two years later by his Master of Science degree. He served as intern and resident at the Royal Victoria Hospital in Montreal, Canada, on the service of Edward Archibald, M.D., that world-famed bronchoscopist and chest physician. It was under Dr. Archibald's mentorship that Will Hudson decided to make the study of diseases of the chest his medical career.

In 1923, Will Hudson came to Detroit as a member of the staff of the Henry Ford Hospital. And in 1925, he established at Grace Hospital in Detroit a Department of Thoracic Surgery as a separate and distinct unit from the Department of Surgery. This was one of the first of its kind in Michigan, and perhaps in the United States, and was also only one of the many Hudson firsts. At Grace Hospital, he collaborated with Hans A. Jarre, M.D., using the Jarre Cinex Camera to demonstrate the peristaltic contractions of the

bronchovesicular tree and the arrhythmic contractions during an asthmatic attack. Invitations for this demonstration were received from many parts of the world.

An amusing incident is related by Dr. Hudson's charming wife, Beneta, a trained nurse who has encouraged and stimulated Will to carry on his experimental efforts and to dedicate them to man: "Will had been invited back the second time to London, England, to give a lecture and to demonstrate the physiological contractions of the bronchovesicular tree as recorded on the x-ray films which were made with the aid of the Jarre Cinex Camera. Will was demonstrating the fine and delicate movements as registered on the films. Suddenly he was interrupted by a very stately London physician, garbed in the dignity of formal attire. 'Dr. Hudson, tell me and this august assembly, just how small those contractions of the bronchus are.' Will, though momentarily off balance because of the interruption, performed well. He held up his hand and with his index finger touched his thumb tightly and in true American style he replied—'They are the teeniest, weeniest contractions imaginable.' The stately British physician's face blanched in embarrassment. A round of applause broke the tension. Will is still wondering about the true interpretation of this applause."

Was it due to the confusion of the stately London physician or to Dr. Hudson's typical American description of small things?

Space does not permit the recording of the scientific papers that William Hudson has written and presented in various parts of the world. Neither does it permit mention of his activities in the teaching and training of the young chest surgeons and the influence he has exerted on their careers. He is known as the doctor's physician. Physicians and literally hundreds of children and adults in metropolitan Detroit are indebted—to the extent of living and enjoying a normal life—to his skill as a bronchoscopist and chest surgeon. He still makes house calls—night calls—even on holidays; and he readily accepts an emergency call to remove a foreign body from an infant's esophagus or lung.

He has dedicated his skill and life to humanity and in that interest he has played an active part in the local, national and international medical societies, not the least of which was his contribution to the formation of an International Congress of Broncho-esophagological Society. In recognition of his interest and activity in this group he was invited to be the speaker at the Third Congress International Broncho-esophagological Society which met in Lisbon, October 10, 1954. As Dr. Hudson sat at the balcony banquet table facing more than 2,000 guests, representing 84 different countries, his mind flashed back momentarily to the Ozarks, and in relating this episode he remarked—"It's a long, long road from the cornfields of the Ozarks to Lisbon."

Thus, in the life of William A. Hudson is exemplified the true meaning of those words—"They reach the higher sunlit fields where those who journey see afar and light lingers even when the sun is down." The light still lingers for Dr. Hudson and we hope it will linger for many, many years. But even when the sun is set his contributions to medical science and humanity will reflect the light that sees afar.

—Clyde K. Hasley, M.D.

COLLER-PENBERTHY CLINIC POSTPONED

The Coller-Penberthy Clinic, which was to have been held in Traverse City in July, has been postponed to August 25-26, 1955, as Fred Coller, M.D., Ann Arbor, and Grover C. Penberthy, M.D., Detroit, will be attending the International Surgical Association meeting in Stockholm, Sweden, on the original date. Dr. Coller is to present a paper at this meeting.

Leland I. Doan

Practical Business Judgment

Described by *Fortune* magazine as "outgoing, articulate, easy and relaxed," Dr. Leland I. Doan is a man who combines a large measure of practical business judgment with a keen sense of human values and a full awareness of industry's social responsibilities.

Just a few weeks ago, in his home community of Midland, he told a Chamber of Commerce gathering that he hoped a prolonged absence of war and an economic era free from extreme pressures would "give us a chance to iron some of the kinks out of our way of life and make the civilization of this planet a little more civilized.

"The material aspects of human civilization," he suggested, "can serve fully only when the soul of civilization advances along with its physical tools."

Nebraska-born Doan moved to Ann Arbor in his youth and received his education at Ann Arbor High School and the University of Michigan. Upon leaving the University in 1916, he went to work for the Michigan Bell Telephone Company, but after a year shifted to The Dow Chemical Company, of which he has been President since 1949.

The move to Dow was a natural one, since a college romance had resulted in his marriage, in 1917, to Ruth Alden Dow, daughter of Dr. Herbert H. Dow, founder of the Dow company. Mrs. Doan died quite suddenly a few years ago, and Doan subsequently married Mrs. Mildred Mellus, widow of a former Brighton physician.

After getting his indoctrination into the chemical business in chlorine production, Doan transferred to the company's sales department in 1918, and it was there that he found the bottom rung of his particular ladder.

He organized Dow's first advertising department in 1920, and showed so much executive ability that, two years later he was made assistant general sales manager. In 1929, he became general sales manager and continued to head the firm's sales organization until 1949, when he was elected to the presidency, following the death of Dr. Willard H. Dow.

On the way up, he had become a director in 1935, a vice president in 1938, a secretary of the corporation in 1941.

While Dow has a long record of pace-setting growth, it has come up almost fabulously in the relatively short span of Doan's leadership, more than doubling its sales and stepping into the ranks of the first five U. S. chemical companies. His explanation: "The most fundamental factor behind our growth is that the will to progress is an inherent part of the personality of the Dow company."

Better than many executives, Lee Doan knows when it is time for business and time for relaxation. He knows how to delegate responsibility,

Dr. Doan was principal speaker and special guest at the testimonial banquet honoring national medical leaders during the 1955 Michigan Clinical Institute in Detroit. As President of the Dow Chemical Company which sponsors the prize-winning television program "Medic" and which has been a leader in scientific research and health education, Dr. Doan was presented by the Michigan State Medical Society with a scroll at the March 10 dinner.

and does so, lending vigor and group thinking to the organization and, at the same time, sparing some of his own energy.

There are times when the views of different segments of a large corporation are inevitably divergent. Doan's diplomacy, objectivity and sense of proportion make him an excellent "balance wheel" in bringing multi-faceted problems into proper focus for judicious solution.

While acutely conscientious about his responsibilities to Dow Chemical, he believes a modicum of outside experience helps keep an executive from getting in a rut, broadens his outlook and better fits him for his primary task. It is this sort of thinking that led him to accept a directorship in the Michigan Bell Telephone Company. It also let him be persuaded in 1951 to take his first and only venture into politics. He ran successfully for Regent of the University of Michigan and took office in that position on January 1, 1952. He is also currently a director of the Manufacturing Chemists' Association and the Armed Forces Chemical Association.

Doan was honored for his achievements in 1952 when Case Institute of Technology conferred upon him the honorary degree of Doctor of Engineering. An outspoken believer in traditional American business principles and an unquenchable economic optimist, he has been much in demand as a speaker before business and civic organizations.

In recent years, he has appeared before such groups as the New York State Chamber of Commerce, Bankers Club of Detroit, California Manufacturers Association and the National Chamber of Commerce. He genuinely enjoys such appearances, but his corporate responsibilities take definite priority. Intensely community conscious, he is, if anything, more likely to accept an invitation from a "Dow community" group than from a large national organization.

"So long as our youth," he says, "are brought up to believe in the essential dignity of the individual . . . of the essential rightness of hard work and honest competition . . . they will grasp their opportunities and put them to work for financial profit to themselves and material benefit to others."

He can back up his contention, if necessary. He attributes much of his company's phenomenal success to its historic policy of "growing its own" executives. No capable and ambitious Dow man need worry about someone being "hired in" over his head. Among those well on their way up are two sons, Leland A. Doan, Dow's Western Sales Manager; Herbert D. Doan, a member of the executive research staff; and a son-in-law, Parker Frisselle, Manager of the Market Research Department.

University of Michigan
Postgraduate Course in Otolaryngology

The Department of Postgraduate Medicine of the University of Michigan Medical School announces the Otolaryngology Conference to be given at the University Hospital, Ann Arbor, Michigan, on April 14, 15 and 16, 1955, under the direction of Dr. A. C. Furstenberg, Chairman of the Department of Otolaryngology at the University of Michigan Medical School.

Guest Lecturers: Dr. John M. Converse, New York City, N. Y.
Dr. Julius Lempert, New York City, N. Y.
Dr. Alden H. Miller, Los Angeles, Calif.
Dr. Werner Mueller, Boston, Massachusetts
Dr. Henry L. Williams, Rochester, Minnesota

Resident Lecturers: Dr. A. C. Furstenberg
Dr. J. H. Maxwell
Dr. Walter J. Nungester
Dr. James L. Wilson
Dr. J. F. Holt
Dr. Isadore Lampe

For further information, address: Dr. John M. Sheldon, Director, Department of Postgraduate Medicine, University Hospital, Ann Arbor, Michigan.

Wayne University College of Medicine

Postgraduate Continuation Courses

March 14-June 11, 1955

These courses are open to all qualified persons. Veterans receiving benefits under the G. I. Bill should contact Dr. Arthur Johnson, Veterans Administrator at Wayne University, 666 Student Center Building, 5050 Cass. Registration for these courses should be made in the office of Postgraduate Medical Education at the College of Medicine, 1401 Rivard, *before March 12.*

ANATOMY			
Surgical Anatomy (Limited to 20 Surgical Residents)	College of Medicine	Tues. 1-5	$50.00
Regional Anatomy			
Head and Neck	College of Medicine	Fri. 1-5	$50.00
Thorax, Abdomen & Pelvis	College of Medicine	Wed. 1-5	$50.00
Back and Extremities (Regional Anatomy open to graduates of dentistry)	College of Medicine	Thur. 1-5	$50.00
Special Dissection (Depending upon availability of material—Contact Dr. Gardner)	College of Medicine	Tues. 1-5	$50.00
MICROBIOLOGY			
Parasitology and Medical Entomology	College of Medicine	M. & W. 2-5	$50.00
Microbiology Seminar	College of Medicine	Thur. 3:30-5	$15.00
PHYSIOLOGICAL CHEMISTRY			
Nutrition	College of Medicine	M. T. W. 11-12	$35.00
Methods and Metabolism	College of Medicine	T. W. Th. F. 8-12	$50.00
P. Chemistry Seminar	College of Medicine	Thur. 3:30-4:30	$15.00
Survey of Medical Chemistry	College of Medicine	Wed. 4-5	$15.00
PHYSIOLOGY AND PHARMACOLOGY			
Seminar	College of Medicine	Tues. 4-5	$15.00
PATHOLOGY			
Cytodiagnosis of Cancer	College of Medicine	Mon. 1-5	$50.00
Histopathology of Ear, Nose and Throat	College of Medicine	Fri. 3-5	$25.00
DERMATOLOGY			
Dermatology Seminar	Receiving Hospital	Wed. 10-12	$15.00
INTERNAL MEDICINE			
Therapeutic Conference (Seminar on new drugs)	Receiving Hospital 243 Farwell Annex	Fri. 5-6	$15.00
Gastroenterologic Clinic (Limit 10)	Receiving Hospital 243 Farwell Annex	Sat. 8-9	$15.00
Medical Seminar	Receiving Hospital 243 Farwell Annex	Mon. 5-6	$15.00
Medical X-Ray Conference (Limit 10)	Receiving Hospital 243 Farwell Annex	1st, 3rd, 5th Tues. 11-12	$15.00
Medical Pathologic Conf. (Limit 10)	Receiving Hospital 243 Farwell Annex	Wed. 11-12	$15.00
Hematology Clinic	Receiving Hospital Med. OPD Farwell Annex	Wed. 1-3	$15.00
ONCOLOGY			
Cancer Detection	Yates Clinic	Wed. 3-5	$25.00
SURGERY			
Surgery Seminar	645 Mullett, 4th Floor	Mon. 4-5	$15.00
COMPREHENSIVE UNIT COURSES			
Conference on Anesthesiology	College of Medicine	April 21, 22, 23 8:30-5:00	$40.00
Basic Ophthalmology	Kresge Eye Institute and Hospitals	Full Time (9 months)	$500.00

This class in Basic Ophthalmology will begin in September, 1955, and applications must be in immediately. Applications can be secured from the Postgraduate Department at the College of Medicine, 1401 Rivard, Detroit 7, Michigan.

Michigan State Medical Society

Annual Session of the Council

Detroit—January 28-29, 1955

HIGHLIGHTS

- The Auditor's Report for 1954, and the budgets for 1955, were approved. (See pages 357 and 360).
- Annual reports of Secretary, Treasurer, and Editor were presented and approved.
- Reports of the three standing committees of The Council, meetings of January 27, were accepted.
- Secretary L. Fernald Foster, M.D., Bay City, Treasurer Wm. A. Hyland, M.D., Grand Rapids, and Editor Wilfrid Haughey, M.D., Battle Creek, were re-elected for 1955.
- Progress Report on Michigan Medical Service was presented by R. L. Novy, M.D., Detroit, Blue Shield President.
- Annual reports of individual Councilors on condition of profession in their districts were presented.
- Monthly reports of Council Chairman William Bromme, M.D., Detroit; President R. H. Baker, M.D., Pontiac; Secretary L. Fernald Foster, M.D., Bay City; Rheumatic Fever Co-ordinator Leon DeVel, M.D., Grand Rapids; and Public Relations Counsel Hugh W. Brenneman, Lansing, were accepted.
- Michigan Health Commissioner A. E. Heustis, M.D., Lansing, presented mutual problems to The Councilors for their information and advice.
- Committee reports were presented by: Arbitration Committee, meeting of December 10; Mental Health Committee, December 15; Postgraduate Medical Education Committee, December 16; Committee on National Defense, January 5; Preventive Medicine Committee, January 6; Permanent Conference Committee, January 12; Industrial Health Committee, January 13; Liaison Committee with Michigan Department of Social Welfare, January 14; Legislative Committee, January 19; Committee on M.D. Placement Program, January 27. Report of January 20 meeting of Michigan Cancer Co-ordinating Committee and also of the January 12 meeting of the Committee on Arrangements for the March 10-11 Operating Room Nurse Conference were presented. Report of Chairman of Committee on Courses in Medical Economics and Ethics was received as information.
- Report on legal action of Wm. A. Kopprasch, M.D., of Allegan, against Michigan State Medical Society, Michigan Hospital Association, Allegan County Medical Society and Board of Trustees of Allegan Center Hospital, was given and appropriate defense by legal counsel et al was outlined.
- The name of A. E. Heustis, M.D., was recomended to Governor G. Mennen Williams for reappointment as Commissioner of Michigan Department of Health, for new term beginning July 1, 1955.
- Michigan Foundation for Medical and Health Education, Inc.: MSMS President R. H. Baker, M.D., urged a better informed profession regarding the excellent activities and services of this Foundation, especially the Student Loan Revolving Fund and the Michigan Rural Health Conference.
- Recent public relations meetings held by various county medical societies, sponsored by MSMS Public Relations Committee, were given praise by President Baker who urged that each Councilor keep his county medical societies and their individual members well informed on what the Michigan State Medical Society is doing. The matter was referred to the new Past Presidents' Club for study and recommendations.

- **Appointments: To the Committee on Blood Banks (a Committee of The Council): R. L. Mainwaring, M.D., Allen Park, Chairman; J. H. Ahronheim, M.D., Jackson; G. R Backus, M.D., Flint; W. G. Gamble, M.D., Bay City; E. R. Jennings, M.D., Detroit; J. A. Kasper, M.D., Detroit; D. L. Kessler, M.D., Grand Rapids; R. E. Lininger, M.D., Benton Harbor; and L. W. Walker, M.D., Lansing.**
  John G. Bielawski, M.D., Detroit, was made Chairman of the Periodic Health Appraisal Committee.
- **Program for the Conference of Executive Secretaries of County Medical Societies in Michigan, to be held at MSMS headquarters, February 15, was approved.**
- **Joint meetings of the Executive Committee of the MSMS Council with the Executive Committee of the Board of Commissioners of the State Bar of Michigan; and also with the Executive Committee of the Michigan Hospital Association, were authorized.**
- **MSMS representatives: (a) A. Hazen Price, M.D., Detroit, to Eighth Annual Conference on Aging, June, 1955, Ann Arbor.**
  (b) William Bromme, M.D., Detroit, to Council on Medical Service, February 19, Chicago.
  (c) K. H. Johnson, M.D., Lansing, to Adult Education Association meeting, East Lansing.
- **1958 MSMS Annual Session dates were changed to September 29 through October 2 to escape conflict with the feast of Yom Kippur.**
- **Criteria for selecting Michigan's Foremost Family Physician were outlined and approved.**
- **The matter of members practicing in one county and holding membership in a neighboring county medical society, as per MSMS By-Laws, Chapter 2, Section 2, was discussed. Michigan law requires that doctors be registered to practice in the county in which they reside (Section 4, Medical Practice Act). The Council recommended to the House of Delegates that membership requirements be reviewed in the light of legal requirements for residence as compared with the county in which member practices.**
- **New application for membership form, used by Wayne County Medical Society, was approved.**
- **Annual County Secretaries-Public Relations Conference: The Council approved the Secretary's recommendation that in future this meeting be a three-day seminar; The Council further approved notification to county societies that "the value of a good secretary increases as his tenure of office lengthens."**

SECRETARY'S ANNUAL REPORT—1954

To: The Council of the Michigan State Medical Society:

I herewith submit the report of the Secretary for the year 1954.

MEMBERSHIP

The Michigan State Medical Society membership for 1954 showed a total of 5,787 members, including 289 Emeritus and Life Members, 62 Retired members and 273 Associate and Military members. The total paid membership was 5,239 with net dues of $102,100.00. The 1954 membership was once again at the highest peak in the history of the Society. The number of members with unpaid dues for 1954 was 33.

DEATHS DURING 1954

I regretfully must report a total of eighty-three deaths among members during the past year:

Bay County—William R. Ballard, M.D., Bay City; Arthur O. Boulton, M.D., Gladwin.

Berrien County—Ina M. Harper, M.D., Benton Harbor.

Calhoun County—Willard N. Putman, M.D., Battle Creek; Wilbur O. Upson, M.D., Oceanside, California.

Cass County—Otis E. Newsome, M.D., Cassopolis.

Delta-Schoolcraft County—Nancy R. Chenoweth, M.D., Peterborough, Canada; Nathan J. Frenn, M.D., Bark River.

Genesee County—Lee D. Harrison, M.D., Flint; James Houston, M.D., Swartz Creek; Edward J. Kaleta, M.D., Flint; Mahlon R. Sutton, M.D., Alden.

Houghton County—Isadore D. Stern, M.D., Houghton.

Ingham County—Henry S. Bartholomew, M.D., Harbor Beach; Frank S. Cross, M.D., Lansing; William E. McNamara, M.D., Lansing.

Jackson County—Jack L. Miller, M.D., Jackson.

Kalamazoo County—Wesley O. Jennings, M.D., Kalamazoo; Benjamin Nibbelink, M.D., Kalamazoo.

Kent County—Elton P. Billings, M.D., Grand Rapids; Alexander M. Campbell, M.D., Grand Rapids; James C. Droste, M.D., Grand Rapids; John T. Hodgen, M.D., Grand Rapids; Bert H. Shepard, M.D., Lowell; Harvard J. Van Belois, M.D., Grand Rapids.

Lenawee County—Esli T. Morden, M.D., Adrian.

MEMBERSHIP RECORD—1954

COUNTY MEDICAL SOCIETY	PAID 1953	PAID 1954	SPECIAL MEMBERS ELIGIBLE FOR RETIRED	SPECIAL MEMBERS ASSOCIATE	SPECIAL MEMBERS AMA	DEATHS 1953	DEATHS 1954	NET MEMBERSHIP 1953	NET MEMBERSHIP 1954	1954 GAIN	1954 LOSS	UNPAID 1953	UNPAID 1954
Allegan	22	22	1	—	—	1	—	23	23	—	—	—	—
Alpena, Alcona, Presque Isle	22	23	2	—	2	—	—	25	27	2	—	—	—
Barry	11	11	3	—	—	—	—	14	14	—	—	—	—
Bay, Arenac, Iosco	67	73	4	2	6	2	2	77	83	6	—	—	—
Berrien	76	77	1	1	7	1	1	83	86	3	—	—	—
Branch	21	25	3	—	—	—	—	24	27	3	—	—	—
Calhoun	102	103	13	1	3	2	2	125	118	—	7	—	—
Cass	10	10	2	—	—	—	1	11	11	—	—	—	—
Chippewa-Mackinac	22	23	3	1	—	—	—	26	27	1	—	—	—
Clinton	15	15	1	—	—	—	—	16	16	—	—	—	—
Delta-Schoolcraft	22	22	2	—	—	—	2	24	22	—	2	1	—
Dickinson-Iron	22	17	—	1	—	1	—	22	18	—	4	—	1
Eaton	18	19	—	—	2	—	—	20	21	1	—	—	—
Genesee	203	205	20	1	7	7	4	224	229	5	—	2	—
Gogebic	20	18	1	—	—	1	—	19	19	—	—	—	—
Grand Traverse, Leelanau, Benzie	40	40	1	3	2	—	—	45	46	1	—	2	1
Gratiot, Isabella, Clare	35	37	3	—	3	—	—	41	43	2	—	—	—
Hillsdale	16	13	5	—	1	—	—	19	19	—	—	—	—
Houghton, Baraga, Keweenaw	22	25	7	—	—	1	1	28	31	3	—	—	—
Huron	13	14	1	—	—	—	—	15	15	—	—	—	1
Ingham	182	190	7	8	7	—	3	200	209	9	—	—	—
Ionia-Montcalm	36	40	3	—	3	—	—	39	46	7	—	2	—
Jackson	99	100	13	1	5	1	1	113	118	5	—	—	—
Kalamazoo	139	142	7	3	5	3	2	149	155	6	—	1	—
Kent	304	323	22	2	27	6	6	340	368	28	—	2	1
Lapeer	15	15	4	—	—	1	—	17	19	2	—	—	1
Lenawee	40	40	2	1	1	1	1	42	43	1	—	—	2
Livingston	20	21	—	—	—	1	—	19	21	2	—	—	1
Luce	8	8	1	—	—	1	—	8	9	1	—	—	—
Macomb	53	60	1	1	—	—	2	55	60	5	—	1	1
Manistee	10	11	1	—	—	—	1	13	11	—	2	—	—
Marquette-Alger	36	35	4	2	1	1	—	40	42	2	—	—	—
Mason	11	11	1	—	—	—	—	12	12	—	—	—	—
Mecosta, Osceola, Lake	14	15	2	—	—	1	—	15	17	2	—	—	—
Menominee	18	17	—	—	—	1	—	18	17	—	1	—	—
Midland	28	29	—	—	—	1	—	27	29	2	—	—	—
Monroe	32	35	2	—	—	2	2	33	35	2	—	—	—
Muskegon	89	94	4	2	1	2	3	95	98	3	—	—	1
Newaygo	9	9	—	—	—	1	—	8	9	1	—	1	1
North Central	21	24	1	1	—	—	—	22	26	4	—	1	—
Northern Michigan	32	33	2	—	2	1	1	34	36	2	—	—	—
Oakland	232	254	16	—	7	3	1	251	276	25	—	2	4
Oceana	7	7	3	—	1	—	—	11	11	—	—	—	—
Ontonagon	4	4	1	—	—	—	—	4	5	1	—	—	—
Ottawa	43	50	2	—	2	—	—	47	54	7	—	—	—
Saginaw	125	124	8	6	4	1	2	137	140	3	—	—	—
St. Clair	59	60	2	4	6	—	2	66	70	4	—	—	—
St. Joseph	23	26	1	1	—	—	1	24	27	3	—	—	—
Sanilac	12	13	—	—	—	—	—	12	13	1	—	1	—
Shiawassee	27	26	1	—	1	—	1	28	27	—	1	1	1
Tuscola	16	18	2	—	—	—	2	19	18	—	1	—	—
Van Buren	22	22	2	—	—	1	1	24	23	—	1	—	—
Washtenaw	189	226	8	3	89	2	5	319	321	2	—	—	6
Wayne	2259	2351	91	17	78	32	33	2385	2504	119	—	14	11
Wexford-Missaukee	15	14	2	—	—			16	16	—	—	1	—
Honorary Members								7	7	—	—	—	—
TOTALS:	5008	5239	289	62	273	79	83	5530	5787	276	19	32	33

Macomb County—Oswald F. Banting, M.D., Richmond; Victor Hugo Wolfson, M.D., Mt. Clemens.

Manistee County—Charles L. Grant, M.D., Manistee.

Monroe County—Silas V. Dusseau, M.D., Erie; Sara J. Long, M.D., Allen Park.

Muskegon County—William A. Hagen, M.D., Muskegon; Roy Herbert Holmes, M.D., Muskegon; Henry J. Pyle, M.D., Muskegon.

Northern Michigan—Harris V. Lilga, M.D., Petoskey.

Oakland County—Waldron W. Wellman, M.D., Holly.

Saginaw County—Arthur Grigg, M.D., Saginaw; Herodotus Roy Wilson, M.D., Saginaw.

St. Clair County—Charles F. Thomas, M.D., Port Huron; Mason E. Vroman, M.D., Port Huron.

St. Joseph County—George J. Sweetland, M.D., Constantine.

Shiawassee County—Roelof Lanting, M.D., Corunna.

Tuscola County—Harry A. Barbour, M.D., Mayville; Bernard H. Starmann, M.D., Cass City.

Van Buren County—Wilbur F. Hoyt, M.D., Paw Paw.

Washtenaw County—John Alexander, M.D., Ann Arbor; Andros Gulde, M.D., Chelsea; Helen F. Price, M.D., Ann Arbor; Harold W. Riggs, M.D., Ann Arbor; John A. Wessinger, M.D., Ann Arbor.

Wayne County—Carl C. Bailey, M.D., Detroit; Donald C. Beaver, M.D., Detroit; Louis Braitman, M.D., Detroit; Harold J. A. Brisbois, M.D., Flint; Benjamin F. Cooper, M.D., Detroit; Henry F. Crossen, M.D., Detroit; E. Nesbitt Dolman, M.D., Detroit; Simon S. Farbman, M.D., Detroit; Linus J. Foster, M.D., Detroit; Allan C. Fullenwider, M.D., Detroit; Arthur M. Gannan, M.D., Detroit; Julius R. Gitlin, M.D., Detroit; John M. Graff, M.D., Detroit; Simpson W. Green, M.D., Detroit; Elmer N. Hunter, M.D., Detroit; Ambrose T. Kibzey, M.D., Detroit; Paul A. Klebba, M.D., Detroit; Albert H. Krohn, M.D., Detroit; Maurice B. Landers, M.D., Detroit; Frederick E. Lapham, M.D., Detroit; Harold U. Mair, M.D., Detroit; Arthur B. McGraw, M.D., Detroit; Helmuth A. Meinecke, M.D., Detroit; Walter J. Muellenhagen, M.D., Detroit; William R. Olmsted, M.D., Detroit; Matthew D. Palevich, M.D., Detroit; Benjamin H. Priborsky, M.D., Detroit; Tom H. Robertson, M.D., Detroit; Stephen S. Skrzycki, M.D., Detroit; Lawrence H. Van Becelaere, M.D., Ecorse; Horace F. W. Warden, M.D., Detroit; Walter J. Wilson, M.D., Detroit; Frank C. Witter, M.D., Detroit.

THE JOURNAL

The following financial information relative to THE JOURNAL is found in the annual audit report of MaDan and Bailey:

Income was $77,515.69 which is $15,115.69 over the tentative budget for 1954. Expenses were $72,738.59 which was $11,132.59 over the tentative budget for 1954. However, a comparison of these figures indicates a net gain for the year 1954 of $4,777.10. This gain is due to the increased advertising rates which were in effect throughout the year and the increased number of advertising pages used during the past year.

THE JOURNAL, during 1954, continued the policy of special distinctive covers to emphasize some of the major activities of the Society, e.g., Cancer, Heart Disease, Michigan Medical Service, et cetera.

FINANCES

An audit of the books of the Society was completed by MaDan and Bailey as of December 24, 1954. This has been submitted to the Finance Committee for study and is available to any member of the society for perusal at the Executive Offices, 606 Townsend Street, Lansing, Michigan.

A brief summary of the audit produces the following information:

Assets:	
Cash	$ 67,639.18
Accounts Receivable	14,656.65
Investments	125,178.50
Property	55,017.47
Other Assets	11,102.50
Total Assets	$273,594.30
Liabilities:	
Accounts Payable	$ 15,533.47
Deferred Income	13,110.00
Total Liabilities	28,643.47
Society Equities	
Reserved for Special Purposes	
Public Education Reserve	30,000.00
Public Education Program	76,816.26
Public Service Account	3,330.00
Professional Relations Account	6,545.92
Rheumatic Fever Control Program	13,645.55
Contingent Fund	29,390.82
Building Fund	11,770.04
General Society Equity	72,893.41
Net Gain for Period	558.83
Total Liabilities and Equities	$273,594.30

From the income and expense statement, we find the total income was $110,500.49 with total expenses of $109,941.66, indicating a net gain of $558.83.

We note from the Income and Expense Summary of December 27, 1953 to December 24, 1954, that the total balance other than Beaumont Portion, was $197,-441.80, Income for the period was $367,688.94, Expenses for the period were $330,660.20, Net Gain is $37,028.74 with a balance on hand of $234,470.54

A review of the general finances of the society shows that the Public Relations Department activities fell well below the established budget. The greatest increase in expenditures occurred in the General Society Activities. This condition suggests that possibly a study should be made of the relative allocations to be made next year to these two departments.

1954 ANNUAL SESSION

We are happy to announce that the 1954 Annual Session broke all previous attendance records with a total of 3,904. This represents an increase of 299 over the previous high of 1948. The breakdown of attendance was as follows:

M.D.'s	2,295
Guests	534
Exhibitors	432
Woman's Auxiliary	171
Medical Assistants	372

The General Assembly type of program with discussion conferences was continued as in previous years.

The ninety-nine Technical Exhibitors received the usual generous attention of the registrants.

1954 HOUSE OF DELEGATES

The House of Delegates transacted the legislative business of the Society with dispatch and thoughtful deliberation. A summary of the proceedings is given herewith.

1. Adopted with thanks the Speaker's Address, the President's Address, the President-Elect's Address, the report of Delegates to the American Medical Association, the Annual Reports of The Council, including Annual Reports of Committees of The Council, and the Annual Report of the Woman's Auxiliary to the Michigan State Medical Society.
2. Adopted Annual Reports of all Standing Committees and of all Special Committees of the Society.
3. Elected Duncan J. McColl, M.D., Port Huron, as Michigan's Foremost Family Physician for 1954.
4. Elected L. Fernald Foster, M.D., Bay City, as President for a Day.
5. Adopted Resolutions concerning:
   (a) Honorary Membership to Don E. Johnson, Flint.
   (b) Migrant Workers (amended).
   (c) Panel with Medical School Deans on undergraduate medical education.
   (d) County Medical Society responsibility in medical civil defense (amended).
   (e) Traffic safety (amended).
   (f) Extension of MSMS Periodic Health Appraisal Program.
   (g) Memorial in JMSMS to the late E. D. Spalding, M.D.
   (h) Commendation to A. E. Heustis, M.D., Michigan Health Commissioner (amended).

   Referred to:
   (a) The Council, a resolution re periodic health examinations by hospital staffs.
   (b) Michigan's AMA Delegates a resolution re expansion of AMA administrative facilities.
   (c) Michigan's AMA Delegates a resolution to study by AMA of general practice.
   (d) Medical Advisory Committee to Michigan Medical Service, part II of a resolution re increase in fees for anesthetics.
   (e) Committee on Study of Basic Science Act, a resolution re greater uniformity by Basic Science Boards.

   Adopted substitute resolutions concerning:
   (a) Blue Shield fees for surgical assistants (in lieu of two resolutions introduced).
   (b) Information by Blue Cross-Blue Shield to contract holders.
6. Adopted amendments to MSMS By-Laws:
   (a) Affecting membership qualifications, in Chapter 5, Sec. 3-f; Chapter 5, Sec. 3-g; Chapter 5, Sec. 4; Chapter 5, Sec. 5, Sec; 8; Chapter 6, Sec. 6; Chapter 8, Sec. 1; and Chapter 15, Sec. 2.
   (b) Changing name of Mental Hygiene Committee to "Mental Health Committee," in Chapter 10, Sec. 3.

7. Disapproved resolutions concerning:
   (a) Request to insurance companies to study fees for anesthetics (part 1 of this resolution).
   (b) Study by hospital staffs of Blue Cross utilization.
   (c) Discontinuance of Veterans Administration home-town medical care program.
   (d) Public relations funds.
   (e) Liberalization of Blue Shield benefits.
   (f) Revision of Blue Shield fee schedule.
   (g) Division of fees.
8. Elected forty-one members to Special Memberships:
   (a) Seventeen members to Life Membership.
   (b) Thirteen members to Retired Membership.
   (c) Ten members to Associate Membership.
   (d) One member to Non-Resident Membership.
9. Elected the following officers:
   (a) B. M. Harris, M.D., Ypsilanti, as Councilor of the 14th District (1959).
   (b) William Bromme, M.D., Detroit, as Councilor of the 18th District (1959).
   (c) W. D. Barrett, M.D., Detroit (1956); W. H. Huron, M.D., Iron Mountain (1956); and R. L. Novy, M.D., Detroit (1956), as Delegates to the American Medical Association.
   (d) G. W. Slagle, M.D., Battle Creek (1956); C. I. Owen, M.D., Detroit (1956); and J. R. Rodger, M.D., Bellaire (1956), as Alternate Delegates to the American Medical Association.
   (e) W. S. Jones, M.D., Menominee, as President-Elect.
   (f) J. E. Livesay, M.D., Flint, as Speaker, House of Delegates.
   (g) K. H. Johnson, M.D., Lansing, as Vice Speaker, House of Delegates.

ORGANIZATIONAL ACTIVITIES

MICHIGAN CLINICAL INSTITUTE

The Eighth Michigan Clinical Institute was held in Detroit, March 10-11-12, 1954, with an attendance of 2,503—the all-time record registration. Innovations: (a) one was the use of color television, featured through the courtesy of Smith, Kline & French Laboratories, Philadelphia; (b) the new "Award for Excellence in Medical Reporting" was presented to Jack Pickering of the *Detroit Times*.

ANNUAL SECRETARIES-PUBLIC RELATIONS CONFERENCE

The Annual County Secretaries-Public Relations Conference was held in Detroit, January 31, 1954; the third annual meeting of Michigan's County Medical Society Executive Secretaries was held in Lansing on February 10, 1954. The programs of both these meetings stimulated greater organizational effort.

OTHER ORGANIZATIONAL ACTIVITIES

Conference for The Student AMA with residents and interns.

Honoring of Michigan Medical leaders who during the year were elected as Presidents of National Medical Organizations.

Organization of Michigan Cancer Co-ordinating Committee.

Continuation of Golden Goose Meetings re over-utilization of Blue Cross.

Especial commendation is due the Woman's Auxiliary and Medical Assistants Society for the development and execution of many worthy projects.

Continued friendly relations have been maintained with the many Governmental Agencies and the Voluntary Agencies and Organizations as in the past.

These have been previously reported in the Annual Report of The Council.

BEAUMONT MEMORIAL

The dedication of the Beaumont Memorial occurred July 17, 1954—a great event marking (a) the epochal discovery made by William Beaumont, M.D., on Mackinac Island in 1822 and (b) the generosity of Michigan's doctors of medicine in contributing thousands of dollars to erect this architectural gem as a Memorial to one of the great physiologists of all time. The Beaumont Memorial will stand for generations as a symbol to the honor and respect which Michigan medical men pay to their Scientific Great.

Sincere thanks are due and payable to the hard-working Beaumont Memorial Committee, especially to its zealous Chairman, Otto O. Beck, M.D., of Birmingham, for his tireless attention to the work of the Beaumont Memorial and the July 17 Dedication.

GROUP HEALTH AND ACCIDENT PROGRAM

This program which became effective Nov. 15, 1953, has continued to grow and a number of claims were processed during 1954.

The Officers of the MSMS feel that this group health and accident insurance program, the first and only insurance program endorsed by the MSMS, is one of the choice privileges of State Society Membership.

COMMITTEES

Limitation of time and space makes it impossible to detail in this report the many activities of all the committees contributing to the many splendid programs of the State Society. The accomplishments of the committees of the Society were achieved at the expense of many hours of personal sacrifice on the part of the personnel of the various committees. During 1954, forty-five committees of the Michigan State Medical Society held a total of one hundred seven meetings and practically every meeting was attended by your Executive Director or Secretary. A total of 441 fellow members of your State Medical Society gave freely of their time to attend these meetings and assist in the operational activities of the State Society. Too much commendation cannot be accorded the committee members who contributed their time and effort to develop and execute constructive programs—both scientific and economic—for the public welfare and to maintain the position of leadership enjoyed by the Michigan State Medical Society in the field of progressive medical planning.

SECRETARY'S LETTERS

As part of the Society's general educational program for individual members and for component County Societies there were issued during the year 1954, five Secretary's Letters, two to all members and three to County Secretaries and keymen. These informational circulars were in addition to the monthly issues of THE JOURNAL with its scientific articles and informative news items. In addition, eight Legislative Bulletins were issued to keymen during the 1954 Spring Legislative Session to keep the membership informed of activities in the State Legislature pertaining to the practice of medicine.

PUBLIC RELATIONS

The pattern of public relations activity was more objective in 1954 than in previous years due to the introduction of the brochure "Winning Friends for Medicine" which gave positive direction in twenty-six projects of major public relations importance. In accordance with the September, 1953, directive of the House of Delegates a great effort has been made, and is continuing, toward the integration of all county medical society PR programs among themselves and with the MSMS.

Keystone of the effort has been a series of sixteen PR Conferences held in the major communities of Michigan at which time officers of the MSMS—notably the President, the Secretary, the Public Relations Committee Chairman, Dr. Payne, and the MSMS executive personnel—have met with the members in all areas of the state whose responsibility it is to direct the public relations activities of the medical profession. The effect of these meetings and the plans formulated in them will be a major force for improvement of our public relations in 1955. (A recommendation on this subject follows.)

It is unnecessary for me to review each of the projects involving the use of communication media in this report for they are available for review in the PR Committee reports and the monthly reports of the PR Counsel. However, it can be said that TV, Radio, Motion Pictures, Newspaper Publicity, Exhibits, Conferences (state and national) were used most effectively and at the very minimal cost commensurate with our needs. Particular attention should be accorded the excellent publicity received from the Beaumont Memorial project and the services rendered by the University of Michigan in that effort. It is also noteworthy that a new sound and color 16 mm motion picture "Planning Your Career" was produced in 1954 at a phenomenally low cost and that the series of additional motion pictures planned in 1954 are now in the process of production: these include a film for doctors of medicine on the Periodic Health Appraisal and for the public on Epilepsy and on the cost of medical care. (A recommendation on the subject follows.)

Your officers and PR representatives have attended state and national conferences of all varieties in the PR field during 1954. Some of the subjects were Medical PR, Professional PR, Adult-Education, Educational TV, Rural Health, Citizens Public Health, Good Government, etc. From all of these and from other sources two important PR needs have become apparent:

(a) The necessity for all *publics* to *realize* that the medical profession is sincerely attempting to (and is succeeding in) extending medical service in step with a rapidly increasing population and, beyond that, to persons and areas not previously or presently receiving optional health service. Coupled with this fact is the expressed need for additional scholarship and loan funds for students at schools of medicine and nursing in Michigan.

(b) The necessity for clear and widely disseminated statements of policy—and the reasons *why* those policies have been adopted—on health questions of vital public interest.

(A recommendation on these subjects follows.)

Your attention is invited to the increasing assistance we are receiving in PR activities from persons and organizations outside of MSMS. This is reflected in the larger number of awards given each year, and particularly this year to newspapers (who have sponsored medical forums and given outstanding publicity to medical affairs) to corporations (such as Dow Chemical for its sponsorship of "Medic") and to individuals who have made outstanding contributions to health (such as those receiving awards at the 1955 MCI and as reflected in jointly sponsored conferences such as the Michigan Rural Heath Conference which had 122 co-sponsoring organizations). The assistance given has been most valuable.

It is becoming increasingly apparent that some forces of business and other representative groups are either unknowingly or purposefully making inroads upon the freedoms of professional people, generally, to practice their respective professions. In past years, and 1954 particularly, we have seen attempts made by business contracts and by legislation, (sponsored in some instances by business interests) to permit the corporate practice of law, medicine, engineering, architecture, etc. We have seen attempts made by legislation (in some cases sponsored by labor groups) to fix fees and services of professional people, thereby reducing the effectiveness of the professional man to serve and lessening the attraction of a professional career to prospective students. The MSMS has an obligation to its members to aid them in the protection of their professional rights and freedoms. Depending upon our action, we as professions can either be caught in the vise of the squeeze play between labor and business or we can be the balance of power between these two gigantic forces. (A recommendation on this subject follows.)

One word of explanation: I have departed from custom in this portion of my report from reviewing in some detail the *specific PR program* carried out. I have done so in order to invite to your attention specific ideas for 1955. In so doing I do not wish to leave the impression that many noteworthy accomplishments have not been made—quite the contrary—we have become so accustomed to outstanding work on the part of our PR Committee and personnel that we can permit ourselves to focus attention on matters of major policy secure in the knowledge that we have sound organizational machinery and well-equipped personnel to expedite its implementation.

LEGISLATION

In the report to the Mid-Summer Meeting of The Council and again in the Report to the September, 1954, Meeting of the House of Delegates, we reviewed our progress in legislation. The Congress and the Michigan Legislature have not been in session since that time prior to January, 1955, and so I shall not elaborate upon 1954 legislation but rather give you a few items that possibly will challenge our attention this year.

It may well be that legislation will be introduced to rectify the situation which threatens as a result of the recent Supreme Court decision in the so-called "Grand View Hospital Case" originating in Gogebic County. A Liaison Committee met with representatives of the Michigan Hospital Association on January 26 to explore possibilities.

There may be attempts to amend the provisions for hospital licensing adopted by the 1954 Legislature, and similarly, there may be action to place the licensing and supervision of convalescent homes in the hands of the State Health Department rather than the Department of Social Welfare. Budget increases no doubt will be sought by the Office of Hospital Survey and Construction.

The Michigan Legislature may be asked to relax its limitations upon the oral prescription of drugs to follow the trend set in a recent liberalization of the federal law.

The status of hospital outpatient departments in the practice of medicine may be considered in the current legislative session.

Several measures dealing with licensure and/or certification of certain groups bordering the practice of medicine, along with the usual legislation instigated by licensed sub-standard healing groups, are expected in the 1955 Legislature. Physical therapists and psychologists are the most frequently mentioned peripheral professions considering licensure or certification, and MSMS has established early liaison to work with them in their problems.

In Washington, Congress probably will consider many measures of direct interest to MSMS and the medical profession. These include such proposals as the doctor draft law extension, health re-insurance, increased medical benefits for the families of men in the armed services, the new standard voluntary health insurance for government employes, military medical scholarships, and federal aid to medical education. Of interest to the individual doctor of medicine may be the renewal of proposals to extend Social Security coverage and/or allow for tax postponement for self-employed persons setting up a pension program.

Mental health will be of importance on both the state and national levels.

The Michigan Legislature will be in session until May, while Congress will undoubtedly continue its deliberations into the summer.

Legislation affecting the practice of medicine, and the health and medical care of the people of Michigan, will be considered to a greater degree than ever before in both Washington and Lansing. To make sure that the people of Michigan and the nation continue to reap the benefits of the world's finest system of medical care, MSMS and its individual members must continue to be alert and increasingly active in analyzing legislative proposals and acting upon them. A sincere interest in legislative matters on the part of doctors of medicine, coupled with effective action, must continue to be a primary objective of MSMS.

EXECUTIVE OFFICE

During 1954, various improvements have been made to the headquarters building at 606 Townsend Street, among which was the furnishing of a reception room, exterior redecoration of the building and improved landscaping.

Several additions have been made to the stenographic staff at the headquarters office.

Mr. Warren Tryloff succeeded Mr. Dwight Jarrell as Field Secretary and was assigned to the Detroit office.

The Executive Office personnel has at all times discharged its duties with commendable loyalty and efficiency.

FOREMOST FAMILY PHYSICIAN AWARD

The Seventh Annual Award was accorded to Duncan McColl, M.D., of Port Huron and will be presented on the occasion of the MCI in March, 1955.

RECOMMENDATIONS

After a careful consideration of the continued successful operation of the MSMS and its many projects and activities, I believe the greatest need seems to be in the better organization of the county societies and I therefore respectfully submit the following recommendation for your consideration—

1. That a three-day meeting be held in January for all County Society secretaries, presidents, presidents-elect, and public relations committee chairmen and that this be a "down to earth" school to effect better liaison and greater follow-through between the MSMS and the County Medical Society—a program to develop a better understanding and co-operation between the State and County units.

2. That the brochure "Winning Friends for Medicine" continue in 1955 to be the PR program recommended to county medical societies (subject, of course, to supplementation and change, as need occasions, by The Council and the PR Committee) and that all county medical societies be urged to select from the projects listed therein those projects which in their aggregate can be expanded and carried out in the communities falling within the jurisdiction of the county medical societies; and further that there be appointed by the Chairman of the State PR Committee a member of that Committee to each Council District to assist the Councilor in supporting this effort in the county medical societies falling within the Councilor District.

3. That an allotment be made in the 1955 budget sufficient to properly produce the three motion pictures needed for professional and public viewing, said motion pictures already having received the approval of the Executive Committee of The Council during the past year. The amount needed for the production of these motion pictures should properly be allocated from PR reserves to the current PR budget of 1955. To repeat, these essential motion pictures are on the subjects of Periodic Health Appraisal, Costs of Medical Care and Epilepsy.

4. That steps be taken to insure the most effective effort toward (a) the maintenance of our professional status and (b) obtaining co-operation with other professions in a campaign to gain public understanding and acceptance of professional standards and practices.

5. That the MSMS schedule and sponsor at least two and not more than four TV and radio simulcasts (with material released in concert to the press) stating MSMS policy and the reasons therefor, on major topics of health importance. These programs to be broadcast on a netwok of TV and radio stations sufficiently large to cover all areas of Michigan.

6. That a study be made of allocation of dues to the PR Department and General Society activities as indicated in the auditors' report, and consistent with the needs of these two departments of the Society.

Your Secretary wishes to express to the members of this Council his sincere appreciation for the helpful co-operation they have accorded him during the past year.

Too much commendation cannot be accorded the members of the Executive office staff for their loyalty, splendid co-operation and efficiency.

We should all be especially grateful to Mr. Brenneman and his staff of exceptionally fine Field Secretaries who have done an unusual job, especially in legislative activities.

Your Secretary is especially appreciative of the constructive advice and services of Mr. Wm. J. Burns, Executive Director, Mr. J. Joseph Hebert, Legal Counsel, Wilfred Haughey, M.D., Editor, and Mr. Robert Roney, Asst. Exec. Director. To everyone who has aided so generously and willingly in the discharge of the duties of his office, your Secretary is most grateful.

Respectfully submitted,

L. FERNALD FOSTER, M.D.

January 28, 1955. *Secretary*

TREASURER'S ANNUAL REPORT—1954

Mr. Chairman and members of The Council of the Michigan State Medical Society:

I herewith submit a report of the securities and cash belonging to the Michigan State Medical Society in my possession as duly elected Treasurer for the year January, 1954, to January, 1955.

The appended list of bonds totaling $67,000 face value are in lock box C, 131 Michigan National Bank Trust Department in Grand Rapids.

1.	Balance on hand as of January 15, 1954	$4,382.37	
2.	Received from bonds called March, 1954	3,024.65	
3.	Net gain due to interest received	1,445.00	
4.	Bonds purchased July 28, 1954	4,000.00	
5.	See Note below		$4.00
6.	Balance on hand as of December 31, 1955	4,848.01	

MICHIGAN STATE MEDICAL SOCIETY BONDS

$15,000	United States of America 1½% Treasury notes due March 15, 1955
$ 5,000	United States of America Series G. Savings Bonds dated May 1, 1946
$ 5,000	United States of America Series G Savings Bonds dated March 1, 1948
$30,000	United States of America Series G Savings Bonds dated August 1, 1946
$ 8,000	United States of America 2¾% Treasury Bonds Investment Series B1975-1980 due April 1, 1980
$ 4,000	United States of America Series K Savings Bonds dated July 28, 1954
Called as of spring 1954:	
$ 3,000	United States of America 1⅜% Treasury Notes
	Money in Cash Balance

Respectfully submitted,

WILLIAM A. HYLAND, M.D.

January 28, 1955 *Treasurer*

NOTE: Paid to Michigan National Bank, to be returned and reported in 1955.

EDITOR'S ANNUAL REPORT

THE JOURNAL of the Michigan State Medical Society has completed its fifty-third year and has published 628 numbers. Its first issue was in September, 1902, with Andrew P. Biddle, M.D., of Detroit as Editor. The objective of the JOURNAL and its excuse for being was to furnish a more frequent, more intimate and sure method of interchanging of interests among the members and to bring to them the very latest in scientific and medical thought.

Items of general interest, of news value, have always received full consideration. In addition to the publication of scientific papers, we have kept the readers informed of the economic conditions affecting our profession. This material has been largely prepared from many sources and condensed from other material. We believe our efforts have contributed to the unquestionably high regard the Michigan profession holds in the nation.

During 1954, we honored six of our members for having gained national prominence as presidents of national medical organizations, and we have a list of eight now ready for honors during the year of 1955, to be used in our JOURNALS up to the month of August.

The size of THE JOURNAL has not significantly changed much over the past few years. In 1942 we published 1,092 pages; in 1943—1,022 pages; 1944—1,134 pages; 1945—1414 pages; 1946—1,692 pages; 1947—1,478 pages; 1948—1,446 pages; 1949—1,566 pages; 1950—1,526 pages; 1951—1,470 pages; 1952—1,654 pages; 1953—1,414 pages, and in 1954—1,454 pages, plus the 84 pages in the Roster. Since the socializing threat became acute immediately after the War, our JOURNAL increased in number of pages, but has not varied too much otherwise.

We have had many compliments on our publishing of the roster in a separate volume and believe it should continue. During 1954, we published papers by 138 different authors, twenty-six from out of state, three appearing twice, one appearing three times, and two appearing four times. J. C. Smith, M.D., of Bay City, has given us four very capable clinico-pathological conferences. We believe our members enjoy these efforts very much.

During the year, we have published sixty book reviews, fifty-two editorials, we have quoted thirteen editorials, and we have prepared seventy obituaries. The editorials during the past year have dealt mostly with economic, social, general, or legislative interest.

It is now at least ten years since we have used a formal cover design. Each month some special interest has been featured by special articles as well as kindred scientific papers, and the cover design has been changed to suit the context.

In January, 1954, we published the MCI number, with the large letters MCI in blue being superimposed on a map of Michigan. February featured the Easter seals in full color, while March was devoted to Epilepsy with four applicable pictures with the brain in color in the center. April for many years has been devoted to Cancer, the cover having the research, education, service dagger and three pictures in circles. May was devoted to the Beaumont Memorial with a picture of the restored building. June featured Robert L. Novy, M.D., and was devoted to Michigan Medical Service, while July, devoted to the Annual Session, was illustrated by the theme "working together" with an operating room scene and a lecture room.

The August cover was the new Michigan State Medical Society headquarters in Lansing, and September was devoted to Pediatrics with a group of children's pictures. Diabetes was especially featured in October, showing the active, hopeful life a diabetic may now enjoy. The roster number was published as a supplement with the number of members inserted in each county on a map of Michigan on the cover. November featured the Christmas seals and was devoted almost entirely to Tuberculosis. December announced the MCI program of 1955 "What's New, Doctor, That You Can Use?" with inserted scenes: laboratory, lectures, and exhibits. We believe the special interest features, as well as the covers, have upheld the high standards of the past years.

THE JOURNALS for 1955 are all tentatively assigned: January is a Heart number, February features Maternal Health (A. M. Campbell Memorial), March Arthritis and Rheumatism, and April, Cancer. May is devoted primarily to Geriatrics and Epilepsy and June to Michigan Medical Service. The Coller-Penberthy Clinic is to be featured in September, and the October issue will be a General Practice number. November will be devoted to Tuberculosis and December to MCI.

The Editor appreciates the wonderful co-operation and assistance he has received and expresses his thanks to the Publication Committee, to the Executive Committee, to The Council, and to the Officers for their co-operation and suggestions and encouragement which has been so freely given. Their loyalty throughout the years has been appreciated, and without it the work would have been a burden instead of a pleasure.

Respectfully submitted,
WILFRID HAUGHEY, M.D.
Editor

January 28, 1955

REPORT OF MADAN AND BAILEY, C.P.A.—1954

The Council, Michigan State Medical Society

In accordance with your request, we have examined the Statement of Financial Condition of the Michigan State Medical Society, Lansing, Michigan, as at December 24, 1954, and the related statements of income and expense and fund transactions for the period December 27, 1953, to December 24, 1954. Our examination was made in accordance with generally accepted auditing standards, and accordingly included such tests of the accounting records and such other auditing procedures as we deemed necessary in the circumstances.

In our opinion, the accompanying Statement of Financial Condition and related statements of income and expense and fund transactions of the Michigan State Medical Society, Lansing, Michigan, present fairly the position of the Society as at December 24, 1954, and the results of its operations for the period then ended, in conformity with generally accepted accounting principles applied on a basis consistent with that of the preceding year.

The Michigan State Medical Society was organized on September 17, 1910, under the laws of the State of Michigan, as a non-profit corporation. The charter has been extended for a period of thirty years from September 17, 1940. The Society is affiliated with the American Medical Association, and it charters county medical societies within the State of Michigan. The purposes of the Society are the promotion of the science and art of medicine, the protection of the public health, and the betterment of the medical profession. In the furtherance of these purposes, the Society publishes THE JOURNAL.

The commercial account maintained at the Michigan National Bank, Lansing, Michigan, was reconciled by us as at December 24, 1954, and further confirmed by direct correspondence with the bank. The Treasurer's account was confirmed by direct correspondence with the Michigan National Bank, Grand Rapids, Michigan. Office cash in the amount of $36.61 in the Lansing Office was counted by our representative, and the ledger balance of $15.00 for the Detroit petty cash was not verified.

Accounts Receivable confirmations have been received from approximately 75% of the debtors with no discrepancies to date. We shall notify your office as to the remaining confirmations, should any variances occur. An aging of the accounts by month of charge is as follows:

October, November, December	$13,501.07
April, May, June	330.89
Employe Expense Advances	300.00
	$14,131.96

An analysis of the changes in investments during the period under review, together with interest income and amortization, is set forth in detail in Schedule 10. Series "K" bonds, in an amount of $45,000.00, were verified by actual count by our representative. The remaining securities were confirmed by direct correspondence with the Michigan National Bank of Lansing and of Grand Rapids, Michigan, who hold the securities under safe-keeping agreements.

In our audit report of 1952, and again in 1953, we suggested that a segregation be made between the cost of Land and Building so as to apportion depreciation on a more equitable basis. We are forced to repeat our recommendation, as good accounting dictates that land is never subject to depreciation.

Furniture and Fixtures for Resale, reflected in the Statement of Financial Condition, in an amount of $119.25, will be reduced upon issuance of bills to the purchasers of this furniture. We were advised that all but three or four pieces of furniture have been sold.

Office equipment, such as desks, typewriters, movie projectors and related items are charged to expense when purchased, but in reality constitute assets to the Society that are not reflected in the Financial Statement. We suggest an inventory of these items be maintained in order to determine the approximate asset value of these items.

A separate schedule of the income and expense of the Beaumont Memorial Restoration Fund is not included in this report. The Income and Expense Summary sets forth the gross receipts of contributions and the gross expenditures for the period under review, with a resulting loss of $738.13.

Your attention is directed to our letter of transmittal, under separate cover, which contains several suggestions for relieving your office of some of its time consuming details.

Membership dues for the period under review were reconciled to the 5,213 paying members. We also accounted for the 5,552 cards issued during the period, including those members who are not paying members of the Society.

Sales of booth space at the Annual Session and the Michigan Clinical Institute were traced through the books of account, as was JOURNAL advertising on a spot check basis at our discretion.

An overall net gain from all Society activities as set forth in Exhibit "C" was $37,028.74, including the Beaumont Fund.

Respectfully submitted,
MADAN & BAILEY
Certified Public Accountants

STATEMENT OF FINANCIAL CONDITION

December 24, 1954

ASSETS

CASH ON HAND AND IN BANKS:			
Michigan National Bank, Lansing, Michigan	$62,739.56		
Michigan National Bank, Grand Rapids, Michigan (Treasurer's Account)	4,848.01		
Office Cash (Lansing and Detroit, Michigan)	51.61		$ 67,639.18
ACCOUNTS RECEIVABLE:			
Advertising, Advances and Other Items	$14,131.96		
Services and Collection Expense	576.37		
Due from Employes	70.67		
	$14,779.00		
Less: Allowance for Doubtful Accounts	134.85		14,644.15
ACCRUED INTEREST RECEIVABLE			12.50
INVESTMENTS (Schedule 10) (Market or Redemption Value—$123,250.00)			125,178.50
PROPERTY AND EQUIPMENT (Schedule 11)			
Office Building and Land	$44,500.00		
Lot Adjoining Office Building	6,000.00		
Building Improvements	3,917.85		
Building Equipment	3,836.09		
Parking Lot	1,913.60		
		$60,167.54	
Less: Depreciation Allowance		5,150.07	55,017.47
OTHER ASSETS:			
Prepaid Expenses		$ 502.96	
Furniture and Fixtures for Resale		119.25	
Funds Advanced to the Beaumont Memorial Restoration Fund		10,480.29	11,102.50
TOTAL ASSETS			$273,594.30

LIABILITIES

ACCOUNTS PAYABLE:			
Federal Unemployment Tax		$ 185.60	
Michigan Unemployment Tax		192.22	
Withholding and O.A.B. Taxes		2,685.64	
Unpaid Invoices		11,185.87	
Refunds Due County Societies		1,284.14	$ 15,533.47
DEFERRED INCOME:			
1955 M.C.I. Booth Sales		$ 12,620.00	
1955 Membership Dues		490.00	13,110.00
TOTAL LIABILITIES			$ 28,643.47
SOCIETY EQUITIES:			
Reserved for Special Purposes			
Public Education Reserve	$30,000.00		
Public Education Program	76,816.26		
Public Service Account	3,330.00		
Professional Relations Account	6,545.92		
		$116,692.18	
Rheumatic Fever Control Program		13,645.55	
Contingent Fund		29,390.82	
Building Fund		11,770.04	
TOTAL RESERVED		$171,498.59	
General Society Equity (12-27-53)	$72,893.41		
Net Gain for Period (Exhibit "B")	558.83		
		73,452.24	
TOTAL EQUITIES (Exhibit "C")			244,950.83
TOTAL LIABILITIES AND EQUITIES			$273,594.30

STATEMENT OF INCOME AND EXPENSE

December 27, 1953 to December 24, 1954

INCOME:			
Membership Dues		$102,100.00	
Miscellaneous		8.11	
Gain on Sale of Books		93.75	
Interest Income	$ 3,074.32		
Amortization	15.02		
		3,089.34	$105,291.20
OTHER INCOME:			
Annual Session (Schedule 2)		$ 473.42	
Michigan Clinical Institute (Schedule 3)		41.23*	
THE JOURNAL (Schedule 4)		4,777.10	5,209.29
TOTAL INCOME			$110,500.49
EXPENSES:			
Administrative and General (Schedule 1)	$49,592.65		
Society Activity (Schedule 1)	35,695.20		
Committee Expense (Schedule 1)	24,649.81		
		$109,937.66	
Treasurer's Unallocated Expense		4.00	109,941.66
NET GAIN			$ 558.83

*Loss

INCOME AND EXPENSE SUMMARY

December 27, 1953 to December 24, 1954

	Balance 12-27-53	*Income for the Period*	*Expenses for the Period*	*Net Gain or Loss**	*Balance 12-24-54*
Equity—General Fund	$ 72,893.41	$105,291.20	$109,941.66	$ 4,650.46*)	
Annual Session		22,600.00	22,126.58	473.42)	
Michigan Clinical Institute		12,460.00	12,501.23	41.23*)	$ 73,452.24
THE JOURNAL		77,515.69	72,738.59	4,777.10)	
Contingent Fund	21,729.67	7,661.15	0	7,661.15	29,390.82
Building Fund	13,002.15	10,214.50	11,446.61	1,232.11*	11,770.04
Beaumont Memorial Fund†	9,742.16*	3,908.63	4,646.76	738.13*	10,480.29*
Lecture Grant	100.00		100.00	100.00*	0
Public Education Reserve	30,000.00				30,000.00
Public Education Program	59,887.04	46,134.00	29,204.78	16,929.22	76,816.26
Public Service		22,942.14	19,612.14	3,330.00	3,330.00
Professional Relations		33,138.61	26,592.69	6,545.92	6,545.92
Rheumatic Fever Control Program	9,571.69	25,823.02	21,749.16	4,073.86	13,645.55
TOTALS	$197,441.80	$367,688.94	$330,660.20	$ 37,028.74	$234,470.54
†*Less:* Applicable to Beaumont Portion	9,742.16*	3,908.63	4,646.76	738.13*	10,480.29*
TOTAL OTHER THAN BEAUMONT PORTION	$207,183.96	$363,780.31	$326,013.44	$ 37,766.87	$244,950.83

Note: The debit balance in the "Beaumont Fund" indicates that all funds have been expended and in addition thereto the Society has advanced a total of $10,480.29.

*Loss

EXPENSES

December 27, 1953 to December 24, 1954

ADMINISTRATIVE AND GENERAL:	
Printing and Mailing	$ 2,029.36
Office Supplies	2,019.86
Postage and Express Charges	3,432.61
Insurance and Fidelity Bonds	4,298.45
Auditing	553.32
Salaries—Administrative	8,700.00
—General Office	17,615.52
General Counsel—Retainer	3,960.00
—Expense	239.22
Equipment and Repairs	1,119.57
Telephone and Telegraph	2,639.37
Payroll Taxes	1,843.96
Miscellaneous	841.41
Secretary's Office Expense	300.00
TOTAL ADMINISTRATIVE AND GENERAL EXPENSES	$ 49,592.65
SOCIETY ACTIVITIES:	
Council Expense	$ 13,588.03
Delegates and Alternates to A.M.A.	7,303.03
General Society Travel	5,730.49
Officers' Travel	4,257.96
Secretary's Letters	634.43
Woman's Auxiliary	1,187.05
Dues Collection Expense	2,294.21
Contributions	700.00
TOTAL SOCIETY ACTIVITY EXPENSES	$ 35,695.20
COMMITTEE EXPENSES:	
Legislative	$ 2,018.06
Postgraduate Medical Education	3,764.01
Preventive Medicine	80.47
Child Welfare	339.92
Geriatrics	389.52
Maternal Health	391.19
Mental Hygiene	865.82
Scientific Radio	39.60
Venereal Disease	103.91
Tuberculosis Control	429.33
Michigan Health Council	10,000.00
Rural Medical Service	155.80
Emergency Medical Service	599.03
Beaumont Memorial Restoration	3,476.18
Permanent Conference Committee	67.24
Sundry Committee Expense	861.32
Bi-Annual Report (Rheumatic Fever)	1,068.41
TOTAL COMMITTEE EXPENSES	$ 24,649.81
TOTAL EXPENSE	$109,937.66

ANNUAL SESSION INCOME AND EXPENSE

December 27, 1953 to December 24, 1954

INCOME:	
Booth Sales	$ 22,600.00
TOTAL INCOME	$ 22,600.00
EXPENSES:	
Scientific Meeting	$ 4,605.51
Registration	308.41
Exhibit Expense	2,551.23
Hotel Expense (M.S.M.S. Staff)	670.63
Officers' Night	146.89
State Society Night	3,794.21
Printing, Mailing and Postage	2,289.34
Press Expense	1,529.42
Scientific Work Committee	316.83
Salaries	4,551.76
House of Delegates	1,055.09
Miscellaneous	307.26
TOTAL EXPENSES	$ 22,126.58
GAIN ON ANNUAL SESSION	$ 473.42

MICHIGAN CLINICAL INSTITUTE INCOME AND EXPENSE

December 27, 1953 to December 24, 1954

INCOME:	
Booth Sales	$ 12,460.00
TOTAL INCOME	$ 12,460.00
EXPENSES:	
Scientific Meeting	$ 1,786.70
Registration	4.30*
Exhibit	3,106.79
Hotel and Entertainment	889.96
Printing, Mailing and Postage	2,207.03
Press Expense	1,002.65
Salaries	2,351.80
M.C.I. Committee Meetings and Miscellaneous	1,160.60
TOTAL EXPENSES	$12,501.23
LOSS ON M.C.I.	$ 41.23

*Loss

EDUCATION PROGRAM

INCOME:	
Allocation from Dues	$ 46,064.25
Miscellaneous	69.75
TOTAL INCOME	$ 46,134.00
EXPENSES:	
Clipping Service	$ 249.54
Committee Meetings	342.43
Equipment and Repairs	949.62
Postage and Mailing	1,384.90
Printing	420.32
Office Supplies	1,333.01
Salaries	13,896.94
Telephone and Telegraph	1,034.87
Travel and Entertainment	5,087.92
Cinema	2,158.13
Display Advertising	1,220.26
Publications and Pamphlets	586.83
Radio	40.66
Miscellaneous	107.04
TV and Radio Programs	392.31
TOTAL EXPENSES	$ 29,204.78
GAIN DURING PERIOD	$ 16,929.22

THE JOURNAL INCOME AND EXPENSE
December 27, 1953 to December 24, 1954

INCOME:	
Allocation from Dues	$ 7,660.60
Subscriptions of Others	827.30
Advertising Sales	62,406.72
Reprint and Cut Sales	5,811.06
Miscellaneous	810.01
TOTAL INCOME	$ 77,515.69
EXPENSES:	
Editor's Expense	$ 2,400.00
Printing, Mailing and Postage	41,903.87
Reprint and Cut	4,466.58
Salaries	10,327.06
Discounts and Commissions	13,262.94
Miscellaneous	188.19
Cash Discounts Allowed	189.95
TOTAL EXPENSES	$ 72,738.59
GAIN ON "THE JOURNAL"	$ 4,777.10

PROFESSIONAL RELATIONS ACCOUNT
December 27, 1953 to December 24, 1954

INCOME:	
Allocation from 1954 Dues	$ 33,138.61
TOTAL INCOME	$ 33,138.61
EXPENSES:	
Postage and Mailing	$ 80.86
Rent to Wayne County Medical Society	530.00
Salaries	13,896.95
Telephone and Telegraph	1,568.75
Travel and Entertainment	4,817.05
National Meeting Expense	1,249.38
Public Relations—County Secretary's Conference	3,032.67
County Society Meetings	398.87
Woman's Auxiliary	676.46
Miscellaneous	41.70
Field Secretary's Office	300.00
TOTAL EXPENSES	$ 26,592.69
GAIN DURING PERIOD	$ 6,545.92

SERVICE ACCOUNT
December 27, 1953 to December 24, 1954

INCOME:	
Allocation from 1954 Dues	$ 22,942.14
TOTAL INCOME	$ 22,942.14
EXPENSES:	
Committee Meetings	$ 33.50
Salaries	13,896.95
Telephone and Telegraph	1,067.56
Travel and Entertainment	4,360.34
Miscellaneous	25.00
Rural Health Conference	228.79
TOTAL EXPENSES	$ 19,612.14
GAIN DURING PERIOD	$ 3,330.00

RHEUMATIC FEVER CONTROL PROGRAM
December 27, 1953 to December 24, 1954

INCOME:	
Grant from Michigan Heart Association	$ 25,525.00
Refund—Pontiac Office	298.02
TOTAL INCOME	$ 25,823.02
EXPENSES:	
Committee Meetings	$ 320.72
Equipment and Repairs	35.00
Payroll Taxes	327.96
Postage	84.87
Printing and Mailing	1,347.99
Salaries—Administrative	9,999.96
—Office	514.64
Travel	688.38
Fellowships	1,500.00
Telephone and Telegraph	42.79
TOTAL CENTRAL OFFICE EXPENSES	$ 14,862.31
CONTROL CENTERS:	
Alpena	$ 208.70
Ann Arbor	400.00
Bay City	1,080.00
Benton Harbor	180.00
Detroit	62.06
Grand Rapids and Muskegon	2,976.00
Jackson	0
Kalamazoo	990.00
Lansing	0
Petoskey	0
Pontiac and Royal Oak	0
Saginaw	0
Saulte Ste. Marie	0
Traverse City	990.09
TOTAL CONTROL CENTERS	$ 6,886.85
TOTAL EXPENSES	$ 21,749.16
GAIN DURING PERIOD	$ 4,073.86

BUILDING AND MAINTENANCE FUND
December 27, 1953 to December 24, 1954

INCOME:	
Allocation from 1954 Dues	$ 10.196.50
Dues—Prior Years	18.00
TOTAL INCOME	$ 10,214.50
EXPENSES:	
Decorating (Exterior) Sandblast and Point	$ 800.00
Painting Exterior	979.00
Landscaping Lot	464.25
Heating	643.21
Lighting	349.25
Water	31.26
Janitor—Salary	3,162.18
—Supplies	51.13
Taxes—Property	753.93
Insurance	449.96
General Repairs	429.59
Depreciation	1,577.69
Window Cleaning	240.00
Miscellaneous	134.82
Reception Room Furnishings	1,380.34
TOTAL EXPENSES	$ 11,446.61
LOSS FOR PERIOD	$ 1,232.11

PROPERTY AND DEPRECIATION ALLOWANCE
December 24, 1954

	Date Acquired	*Cost*	*Depreciation Allowance Prior Years*	*Remaining Cost 12-26-53*	*Estimated Life (Years)*	*Depreciation Expense 1954*	*Depreciation Allowance 12-24-54*
LAND AND BUILDING (Note)	1951	$44,500.00	$2,900.00	$41,600.00		$1,000.00	$3,900.00
BUILDING IMPROVEMENTS:							
New Building Entrance	1953	$ 3,917.85	$ 65.30	$ 3,852.55	30	$ 130.60	$ 195.90
BUILDING EQUIPMENT							
Lighting	1952	$ 2,121.50	$ 282.76	$ 1,838.64	15	$ 141.43	$ 424.29
Boiler	1952	1,714.59	228.54	1,486.05	15	114.30	342.84
		$ 3,836.09	$ 511.40	$ 3,324.69		$ 255.73	$ 767.13
PARKING LOT	1953	$ 1,913.60	$ 95.68	$ 1,817.92	10	$ 191.36	$ 287.04
LOT ADJOINING OFFICE BUILDING		$ 6,000.00	.....	$ 6,000.00		.....	.....
TOTAL		$60,167.54	$3,572.38	$56,595.16		$1,577.69	$5,150.07

Note: No allocation has ever been made to segregate the cost of land and building, hence only an estimate of depreciation is made until such allocation is determined, because the land is not subject to depreciation.

MICHIGAN STATE MEDICAL SOCIETY

1955 BUDGET ESTIMATES

GENERAL FUND

ACCOUNT TITLE	1955 Estimates
INCOME	
5,000 members @ $45.00	$225,000.00
Less:	
Allocation to THE JOURNAL @ $1.50	7,500.00
Allocation to Public Education @ $6.25	31,250.00
Allocation to Public Service @ $3.50	17,500.00
Allocation to Professional Relations @ $5.25	26,250.00
Allocation to Contingent Fund @ $1.50	7,500.00
Allocation to Building Fund @ $2.00	10,000.00
Balance to General Fund @ $25	$125,000.00
Interest Income	2,500.00
Miscellaneous Income	0
TOTAL FUNDS AVAILABLE	$127,500.00
EXPENSES	
Administrative and General:	
Printing and Mailing	$ 2,000.00
Office Supplies	2,000.00
Postage and Express Charges	3,500.00
Insurance and Fidelity Bonds	5,500.00
Auditing	550.00
Salaries—Administrative	10,200.00
Salaries—Office	26,199.06
General Counsel	7,200.00
General Counsel Expense	250.00
Equipment and Repairs	1,600.00
Telephone and Telegraph	2,700.00
Payroll Taxes	2,000.00
Miscellaneous Expense	900.00
Secretary's Office Expense	300.00
Employes' Retirement Trust	7,700.00
Residents and Interns Conference	350.00
Total Administrative and General Expense	$ 72,949.06
Society Activities:	
Council Expense	$ 13,000.00
AMA Delegates and Alternates	7,000.00
General Society Travel and Entertainment	5,700.00
Officers Travel	4,200.00
Secretary's Letter	600.00
Woman's Auxiliary	600.00
Dues Collection Expense	2,300.00
Contributions (World Medical Assn., SAMA)	700.00
Total Society Expense	$ 34,100.00
Committee Expense:	
Cancer Co-ordinating Committee	$ 2,000.00
Child Welfare	300.00
Civil Defense	600.00
Geriatrics	400.00
Industrial Health	200.00
Legislative	2,000.00
Maternal Health	400.00
Mental Health	400.00
Michigan Health Council	10,000.00
Postgraduate Medical Education	4,000.00
Preventive Medicine	100.00
Permanent Conference Committee	300.00
Rural Medical Service	200.00
Scientific Radio	50.00
Tuberculosis Control	200.00
Venereal Disease	200.00
Beaumont Memorial Restoration	500.00
Highway Accident Committee	500.00
Sundry Committee Expense	1,000.00
Total Committee Expense	$ 23,350.00
TOTAL GENERAL FUND EXPENSES	$130,399.06
GAIN OR LOSS FOR THE YEAR (LOSS)	$ 2,899.06
BALANCE FROM PRIOR YEARS	73,456.24
	$ 70,557.18
NET GAIN OR LOSS FROM ANNUAL SESSION, MCI, JOURNAL (GAIN)	1,354.37
BALANCE TO 1956	$ 71,911.55

CONTINGENT FUND (SURPLUS)

INCOME	
Allocation from Membership Dues	$ 7,500.00
Balance from Prior Years	29,390.82
TOTAL	$ 36,890.82

BUILDING MAINTENANCE FUND

INCOME	
Allocation from Membership Dues	$ 10,000.00
EXPENSES	
Decorating	$ 500.00
Landscaping	200.00
Heating and Hot Water) Lighting Water } Utilities	650.00
	350.00
	50.00
Salary—Janitor	3,318.00
Supplies—Janitor	100.00
Property Taxes	750.00
Insurance	450.00
General Repairs	500.00
Depreciation	1,600.00
Window Cleaning	250.00
Furnish Reception Room	100.00
Miscellaneous Expense	200.00
TOTAL EXPENSES	$ 9,018.00
GAIN OR LOSS FOR THE YEAR (GAIN)	982.00
BALANCE FROM PRIOR YEARS	11,770.04
BALANCE TO 1956	$ 12,752.04

ANNUAL SESSION

INCOME	
Booth Sales (125 spaces)	$ 25,000.00
EXPENSES	
Scientific Meeting Expense	$ 5,500.00
Exhibit Expense	4,000.00
Registration	300.00
Hotel Expense (MSMS Staff)	600.00
Officers Night	250.00
State Society Night	4,000.00
Printing, Mailing and Postage	2,300.00
Press Expense	1,500.00
Scientific Work Committee	500.00
Salaries	4,407.33
House of Delegates	1,000.00
Miscellaneous Expenses	500.00
TOTAL EXPENSES	$ 24,857.33
GAIN OR LOSS ON ANNUAL SESSION (GAIN)	142.67

MICHIGAN CLINICAL INSTITUTE

INCOME	
Booth Sales (74 spaces)	$ 12,600.00
EXPENSES	
Scientific Meeting	$ 2,000.00
Exhibit Expense	3,200.00
Registration	200.00
Hotel Expense (Including Entertainment)	500.00
Printing, Mailing and Postage	2,100.00
Press Expense	1,000.00
Salaries	2,307.33
MCI Committee Meetings	100.00
Miscellaneous Expense	300.00
Television Expense	510.00
TOTAL EXPENSES	$ 12,217.33
GAIN OR LOSS ON MCI (GAIN)	382.67

PUBLIC EDUCATION ACCOUNT

INCOME	
Allocation from Membership Dues	$ 31,250.00
TOTAL INCOME	$ 31,250.00
EXPENSES	
Clipping Service	$ 220.00
Committee Meetings	300.00
Equipment and Repairs	500.00
Postage and Mailing	1,500.00
Printing	500.00
Office Supplies	1,600.00
Salaries	16,500.00
Telephone and Telegraph	500.00
Travel and Entertainment	1,500.00
Cinema	2,500.00
Display Advertising	1,000.00
Publications and Pamphlets	2,500.00
Radio and Television	8,500.00
Miscellaneous Expenses	200.00
TOTAL EXPENSES	$ 37,820.00
GAIN OR LOSS FOR THE YEAR (LOSS)	6,570.00
BALANCE FROM PRIOR YEARS	76,816.26
TOTAL TO 1956	$ 70,246.26

THE JOURNAL

INCOME

Allocation from Membership Dues	$ 7,500.00
Subscriptions—Non-Members	700.00
Advertising Sales	59,000.00
Reprint and Cut Sales	3,500.00
Miscellaneous Income (Incl. Cash Disc.)	700.00
TOTAL INCOME	$ 71,400.00

EXPENSES

Editor's Expense	$ 3,000.00
Printing, Mailing and Postage	39,000.00
Reprint and Cut Expense	3,000.00
Salaries	12,770.97
Discounts and Commission on Advertising Sales	13,000.00
Cash Discounts Allowed	200.00
Miscellaneous Expense	200.00
TOTAL EXPENSES	$ 71,170.97
GAIN OR LOSS ON THE JOURNAL (GAIN)	229.03

PUBLIC SERVICE ACCOUNT

INCOME

Allocation from Membership Dues	$ 17,500.00

EXPENSES

Committee Meetings	$ 100.00
Salaries	16,500.00
Telephone and Telegraph	1,000.00
Travel and Entertainment	3,000.00
Rural Health Conference	250.00
Miscellaneous Expense	1,000.00
Legislative Bulletin	300.00
TOTAL EXPENSES	$ 22,150.00
GAIN OR LOSS FOR THE YEAR (LOSS)	4,650.00
BALANCE FROM PRIOR YEARS	3,330.00
BALANCE TO 1956 (LOSS)	$ 1,320.00

RHEUMATIC FEVER CONTROL PROGRAM

INCOME

Michigan Heart Association	$ 30,050.00
TOTAL INCOME	$ 30,050.00

EXPENSES (Central Office)

Committee Meetings	500.00
Equipment and Repairs	200.00
Payroll Taxes	300.00
Postage	200.00
Printing and Mailing	800.00
Office Supplies	200.00
Publications and Pamphlets (Purchased)	100.00
Salaries—Administrative	11,000.00
Salaries—Office	600.00
Travel	1,500.00
Fellowships	3,000.00
Special Equipment	500.00
Furniture and Fixtures	250.00
Laboratory Aid Plan	1,000.00
Telephone and Telegraph	100.00
Miscellaneous Expense	0
TOTAL CENTRAL OFFICE EXPENSE	$ 20,250.00

Control Center Expense

Alpena	$ 300.00
Ann Arbor	300.00
Bay City	1,000.00
Benton Harbor	200.00
Detroit	1,000.00
Grand Rapids and Muskegon	4,000.00
Jackson	100.00
Kalamazoo	1,000.00
Lansing	100.00
Petoskey	100.00
Pontiac and Royal Oak	200.00
Saginaw	200.00
Sault Ste. Marie	100.00
Traverse City	1,200.00
TOTAL CONTROL CENTER EXPENSE	$ 9,800.00
TOTAL EXPENSES	30,050.00
GAIN OR LOSS FOR THE YEAR	0
BALANCE FROM PRIOR YEARS	13,645.55
BALANCE TO 1956	$ 13,645.55

PROFESSIONAL RELATIONS ACCOUNT

INCOME

Allocation from Membership Dues	$ 26,250.00

EXPENSES

Committee Meetings	$ 300.00
Postage and Mailing	250.00
Printing	500.00
Rent to Wayne County Medical Society	700.00
Salaries	16,500.00
Telephone and Telegraph	1,200.00
Travel and Entertainment	3,000.00
National Meeting Expense	2,500.00
County Secretaries—PR Conference	3,000.00
County Society Meetings	500.00
Woman's Auxiliary	1,000.00
Field Secretary's Office Expense	500.00
Field Secretary's Meetings	500.00
Miscellaneous Expenses	200.00
Awards Committee and Dinner	1,000.00
TOTAL EXPENSES	$ 31,650.00
GAIN OR LOSS FOR THE YEAR (LOSS)	5,400.00
BALANCE FROM PRIOR YEARS	6,545.92
BALANCE TO 1956	$ 1,145.92

The following items have been authorized by The Council MSMS for expenditure during 1954. Work has been started on some of these projects although delivery and payment has not yet been completed. Therefore, these items should not be charged to the 1955 expenses but should be charged to reserves. Thus the gain as indicated in 1954 would have been smaller had the work been completed and paid during the past year.

Medical Associates Pamphlets	$ 2,000.00
Safety in the Home Pamphlets	1,000.00
Slides for Television	1,000.00
TV and Radio Programs*	5,000.00
Cinema (three films to be produced)	15,000.00
Purchase of Film Library (seven films to be purchased)	500.00
Display Cards for Doctors Offices	1,000.00
Handbook (Michigan State Medical Society)	1,150.00
Handbook (Michigan State Medical Assistants Society)	200.00
	$ 26,850.00

*Not used because TV and Radio broadcast of MSMS policy was free due to the public interest.

POLITICS AND MEDICAL CARE

Someone mailed Dr. F. J. L. Blasingame, AMA Trustee from Texas, the following clipping entitled "Private Security," from the *Dallas Morning News:*

"Ninety-five of every 100 workers are now covered by some kind of private—not government—benefit program. This is not the brag of private business. It is a government figure.

"Nine of ten have life insurance. Eight of ten have hospital insurance, and more than half of those have surgical policies. Six of ten are covered for sickness and accident. Five of ten have medical care. Six of ten have their own company pension coverage.

"Yet, there is growing pressure in Washington for the Federal Government to get into the medical business. It makes just as much sense as the government going into the automobile business so that those who don't have a car can have one—at taxpayers' expense. That pressure is for political 'care,' not medical care."—*AMA Secretary's Letter.*

Michigan's Department of Health

Albert E. Heustis, M.D., Commissioner

USE OF SALK VACCINE PLANNED

Plans for use of the Salk vaccine in Michigan, if it is proved effective and is licensed, were discussed at the Commissioner's Conference of Directors of Full-time Local Health Departments in Lansing on February 2, 3 and 4.

Dr. Heustis urged each health officer to confer at once with his local physicians, school and community officials and representatives of the local Chapter of the National Foundation for Infantile Paralysis to draw up a plan suitable for their local situation.

The National Foundation will distribute to state health officers sufficient Salk vaccine (if and when it is licensed) for injection of all children enrolled in the first and second grades of all public, private and parochial schools in the continental United States, Alaska and Hawaii. Included in the Michigan program also will be all children in the 1954 field trial areas who received only the placebo.

The dosage schedule that was observed in the 1954 field trial will be followed in the 1955 program. This was 1 cc. of vaccine in each of the three doses, given intramuscularly, the second inoculation one week after the first and the third inoculation four weeks after the second.

In addition to the vaccine to be distributed by the National Foundation sufficient for 9,000,000 children, it is anticipated that vaccine for 10,000,000 additional persons will be available through regular commercial channels.

The need for early planning, even before the results of the evaluation study are known, arises from the shortness of time anticipated between the decision of the Evaluation Center and the closing of schools and beginning of the polio season. It is considered wiser to have plans in readiness that are not used than to be unprepared if the decision should be favorable.

TB AND VD EXAMINATIONS OF MIGRANT WORKERS

Plans are being drawn up for TB and VD examinations of migrant laborers in seven counties in the spring. The counties to be included in the program are in the Thumb area, Saginaw, Bay, Midland, Isabella, Tuscola, Sanilac and Huron.

DOUGLAS H. FRYER, NEW CHIEF OF LOCAL HEALTH SERVICES

Douglas H. Fryer, M.D., D.P.H., became Chief of the Section of Local Health Services of the Michigan Department of Health on February 1, filling the position left vacant several months ago by the resignation of Dr. Arthur B. Baker.

Dr. Fryer was with the Department in 1943 and 1944, leaving to accept a position in the East. He returned to Michigan in 1953 to become Director of the Lansing-Ingham County Health Department. He left that position to join the State Health Department staff.

Dr. Fryer's medical degree and his public health degree are from the University of Toronto. He is a Diplomat of the American Board of Preventive Medicine and Public Health.

INFECTIOUS HEPATITIS

Cases of infectious hepatitis reported in Michigan in 1954 were 63.5 per cent higher than the number reported in 1953. Deaths for the two years remained fairly constant, however, indicating that some of the increase could be due to more complete reporting. The Michigan record for the past five years follows:

Year	Cases	Deaths
1950	48	20
1951	325	23
1952	285	23
1953	868	25
1954	1,419	23

Figures for the United States as a whole show a slightly lower increase. Cases reported in 1953 totaled 33,363 in comparison with the 1954 total of 49,727. This is an increase of 49 per cent.

Immune globulin is available from the state or local health departments for all household contacts of cases of infectious hepatitis.

VD REGIONAL MEETING PLANNED

Tentative agenda are available from the department for the Venereal Disease Control Seminar for Mid-Western States in Omaha, Nebraska, March 9 and 10. The Seminar is sponsored by the Public Health Service. Physicians interested are invited to attend.

"BETTER CARE THROUGH BETTER TEACHING"

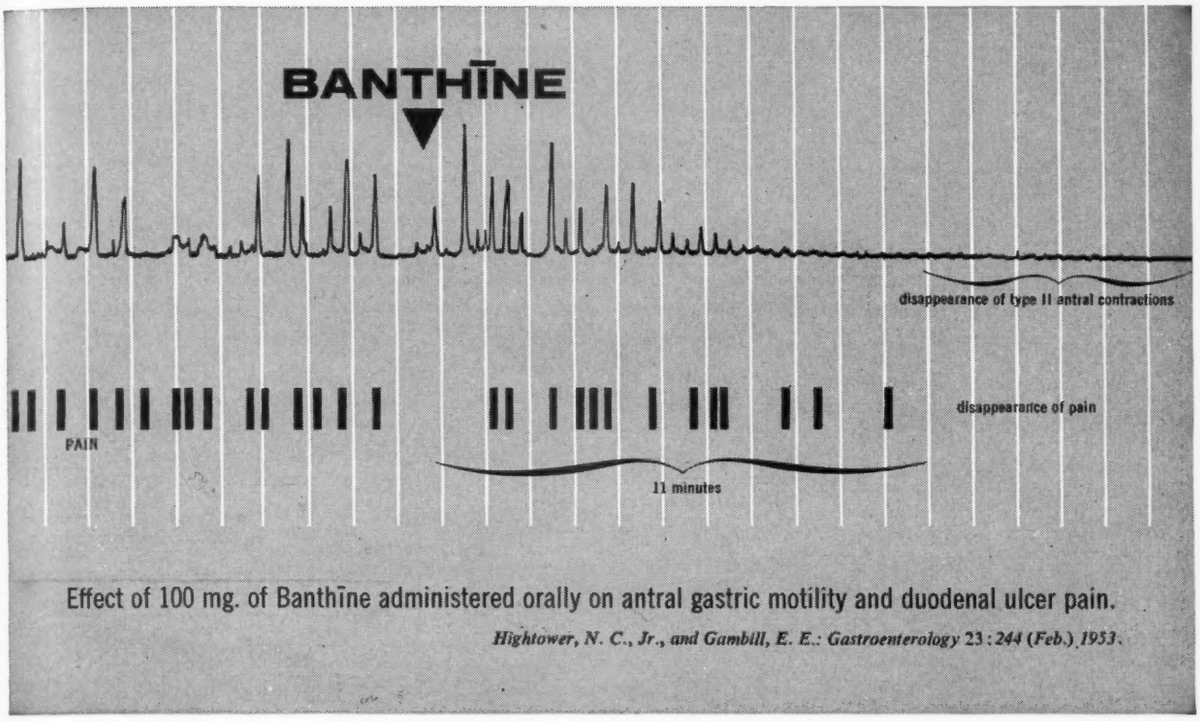
The Michigan Department of Health is co-operating with the University of Michigan School of Nursing in an Institute for obstetrical supervising nurses on "Better Care Through Better Patient Teaching." The Institute will be held at Women's Hospital, University of Michigan, April 11 through April 15.

In order that the nurses may have an opportunity for maximum participation, the course will be limited to a few nurses at one time and will be repeated. Application should be made to Mrs. Rella H. Maxwell, Research Assistant, University of Michigan, Women's Hospital, Ann Arbor.

EXPECTANT PARENT EDUCATION

A "Workshop on Expectant Parent Education" for nurses with experience in teaching expectant parents will be sponsored by the Michigan Department of Health at Haven Hill Lodge, April 19, 20 and 21. Application should be made to the Maternal and Child Health Section of the department.

(Continued on Page 390)



Effect of 100 mg. of Banthīne administered orally on antral gastric motility and duodenal ulcer pain.

Hightower, N. C., Jr., and Gambill, E. E.: Gastroenterology 23:244 *(Feb.) 1953.*

Hypermotility and Hyperacidity

A recent evaluation of anticholinergic therapy in peptic ulcer emphasizes the fact that now the profession has at its disposal agents that are "effective in reducing both secretory and motor activity of the stomach."

The effect on motor activity is generally more pronounced and less variable than on secretion; pain relief is usually prompt; a high degree of effectiveness is noted in ambulatory ulcer patients.

Ruffin, J. M.; Texter, E. C., Jr.; Carter, D. D., and Baylin, G. J.: J.A.M.A. 153:1159 *(Nov. 28) 1953.*

With its proved anticholinergic effectiveness, Banthine has been found extremely useful in the medical management of active peptic ulcer, whether duodenal, gastric or marginal.

The immediate increase in subjective well-being and the simplicity of the Banthine regimen assures patient cooperation. The recommended initial therapeutic dose is 50 or 100 mg. (one or two tablets) every six hours around the clock, with subsequent individual adjustment. The usual measures of diet regulation, rest and relaxation should be followed.

Banthine is effective in other conditions caused by excess parasympathetic stimulation. These include hypertrophic gastritis, acute and chronic pancreatitis, biliary dyskinesia and hyperhidrosis. Banthine is contraindicated in the presence of glaucoma and should be used with caution in the presence of severe cardiac disease or prostatic hypertrophy.

Banthine bromide (brand of methantheline bromide) is supplied in scored tablets of 50 mg. and in ampuls of 50 mg. It is accepted by the Council on Pharmacy and Chemistry of the American Medical Association. G. D. Searle & Co., Research in the Service of Medicine.

SEARLE

. . . . . NEWS MEDICAL

MICHIGAN AUTHORS

Sherwin J. Lutz, M.D., Detroit, is the author of an article entitled "Primary Tumors of the Ureter," published in the *Harper Hospital Bulletin,* November-December, 1954.

J. R. Van der Veer, M.D., Detroit, is the author of an article entitled "Changes in Serologic Procedures: The Differential Heterophile Antibody Test," published in *Harper Hospital Bulletin,* November-December, 1954.

Irving Feller, M.D., Ann Arbor, is the author of an article entitled "Control of Nausea and Vomiting after Ether Anesthesia in Obstetrics," published in *University of Michigan Medical Bulletin,* December, 1954.

Nancy Furstenberg, M.D., Ann Arbor, is the author of an article entitled "The Treatment of Pulmonary Ether Anesthesia in Obstetrics," published in *University of Michigan Medical Bulletin,* December, 1954.

Paul Firnschild, M.D., Detroit, is the author of an article entitled "Splenectomies at Harper Hospital—1947-1953," published in the *Harper Hospital Bulletin,* November-December, 1954.

Perry B. Miller, M.D., and **David J. Sandweiss, M.D.,** Detroit, are the authors of an article entitled "Perforation of a Post-Gastrectomy Stomal Ulcer during Cortisone Therapy," published in *Harper Hospital Bulletin,* November-December, 1954.

Clyde Spencer, M.D., Ann Arbor, is the author of an article entitled "The Physical Diagnosis of Heart Disease," presented before the Victor Vaughan Society and published in the *University of Michigan Medical Bulletin,* December, 1954.

Dwight C. Ensign, M.D., and **John W. Sigler, M.D.,** Detroit, are the authors of an article entitled "Osteoarthritis and Rheumatoid Arthritis, published in *GP,* January, 1955.

Wayne L. Whitaker, Ph.D., Ann Arbor, is the author of an article entitled "Evaluation of the Foreign Trained Physician in Michigan," published in *The Journal of Medical Education* by the Association of American Medical Colleges, November, 1954.

Charles Sellers, M.D., Detroit, is the author of an article entitled "The Problem of Mental Illness" published in the *Detroit Medical News,* and reprinted in *The West Virginia Medical Journal,* January, 1955.

Paul De Kruif, Ph.D., Holland, is the author of an article entitled "Rauwolfia," presented at the annual meeting of the Northern Minnesota Medical Association, September 10 and 11, 1954, and published in *Minnesota Medicine,* December, 1954.

Windsor S. Davies, M.D., Detroit, is the author of an article entitled "Idiopathic Lipemia Retinalis," published in the A.M.A. *Archives of Ophthalmology,* January, 1955.

Sherwin J. Lutz, M.D., Detroit, is the author of an article entitled "Primary Tumors of the Ureter," published in *Harper Hospital Bulletin,* November-December, 1954.

V. K. Volk, M.D., Dr. P.H., F.A.Ph.A., Saginaw County Health Commissioner, **Franklin H. Top, M.D., M.P.H., F.A.Ph.A.,** former Detroit Health Commissioner, and **William E. Bunney, Ph.D., F.A.Ph.A.,** are the authors of an article entitled "Significance of 'Cysts' Following Injections of Antigens," published in *American Journal of Public Health,* October, 1954.

Frederick Stenn, M.D., Chicago, is the author of an article entitled "Medical Maxims of An Internist," published in THE JOURNAL of the Michigan State Medical Society, April, 1954, a digest of which is published in the *Current Medical Digest,* December, 1954.

Ivan J. Mader, M.S., M.D., and **Lloyd T. Iseri, M.D.,** Detroit, are the authors of an article entitled "Biochemical Changes in Uremia Treated by the Artificial Kidney," published in *Wayne University College of Medicine and Detroit Receiving Hospital Bulletin,* December, 1954.

Charles S. Stevenson, M.D., Detroit, is the author of an article entitled "Obstetric Analgesia and Anesthesia—A Current Concept" published in THE JOURNAL of the Michigan State Medical Society, August, 1954, an abstract of which is published in the *Wayne University College of Medicine and Detroit Receiving Hospital Bulletin,* December, 1954.

Harold Christian Zweng, M.D., Detroit, is the author of an article entitled "A Case of Retinoblastoma and Congenital Absence of Schlemm's Canal in the Same Eye," published in *Kresge Eye Institute Bulletin,* February, 1954.

Edward F. Purcell, M.D., and **David Schane, M.D.,** Detroit, are the authors of an article entitled "Diamox in the Management of Glaucoma," published in *Kresge Eye Institute Bulletin,* February, 1954.

A. M. Riazi, M.D., and **James Marshall, M.D.,** Detroit, are the authors of an article entitled "Bilateral Retinal Detachment Associated with Bilateral Uveitis" published in the *Kresge Eye Institute Bulletin,* February, 1954.

Robert C. Antle, M.D., Detroit, is the author of an article entitled "Diffuse Malignant Melanoma of the

(Continued on Page 366)

ELECTRON PHOTOMICROGRAPH

Diplococcus pneumoniae 44,000 X

Diplococcus pneumoniae (Streptococcus pneumoniae) is a Gram-positive organism commonly involved in

lobar—and bronchopneumonia • chronic bronchitis • mastoiditis • sinusitis otitis media • and meningitis.

It is another of the more than 30 organisms susceptible to

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(Continued from Page 364)

Choroid" published in the *Kresge Eye Institute Bulletin,* February, 1954.

Thomas Geoghegan, M.D., and **Brock E. Brush, M.D., F.A.C.S.,** Detroit, are the authors of an article entitled "The Effect of ACTH on the Integrity of Anastomoses of the Colon," published in *Surgery, Gynecology and Obstetrics,* January, 1955.

J. L. Wilson, M.D., and **D. G. Dickinson, M.D.,** Ann Arbor, are the authors of an article entitled "Studies in Respiratory Insufficiency. II. Clinical Evidence of Early Respiratory Insufficiency," published in *American Journal of Diseases of Children,* 87/5:594-599, 1954.

Robert H. Hume, M.D., and **Robert W. Buxton, M.D.,** Ann Arbor, are the authors of an article entitled "Postcholecystectomy Amputation Neuroma" published in *The American Surgeon,* and condensed in the *American Practitioner and Digest of Treatment,* December, 1954.

H. M. Pollard, M.D, Ann Arbor, is the author of an article entitled "Hemorrhage from the Upper Gastrointestinal Tract," presented before the General Asesembly, 112th Annual Meeting of the Illinois State Medical Society, May, 1954, and published in the *Illinois Medical Journal,* January, 1955.

* * *

Nur M. Malik, M.D., formerly of Detroit, has accepted a position as Chief Surgeon, Male Division, and Medical and Surgical Director, Male Division, of Holy Family Hospital at Rawalpindi, Pakistan, effective March 1, 1955.

* * *

The annual Beaumont Lecture of the Wayne County Medical Society, now recognized as a leading Michigan event in medicine, was given this year by Dr. Carl V. Weller, professor of pathology and chairman of the University of Michigan's Department of Pathology on February 7.

His subject was "Causal Factors in Cancer of the Lung." Dr. Weller said, "In view of the real and alarming increase in cancer of the lung, search for possible causal factors has become extremely active. The background for such investigations can be found in medical history and in a biologic consideration of the interaction between intrinsic and extrinsic factors." . . . "Knowledge of this background is essential to a proper appreciation of the interest of the present day in the smoking of tobacco and in the exhaust from internal combustion engines as relatively new factors in human environment."

* * *

At a recent meeting of the Detroit Board of Commerce Committee, Cyrus H. Maxwell, M.D., Assistant Director of the American Medical Association, made the

(Continued on Page 368)

Say you saw it in the Journal of the Michigan State Medical Society

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Sulfamethazine

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Low Renal Toxicity

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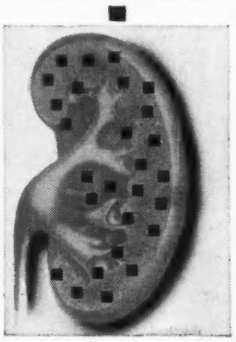
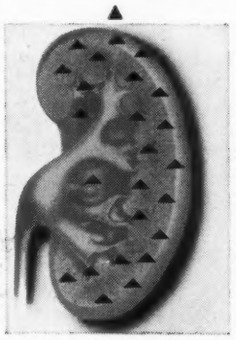


Sulfamerazine:
Danger of blockage
▲



Sulfamethazine:
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Blockage very unlikely
with therapeutic doses
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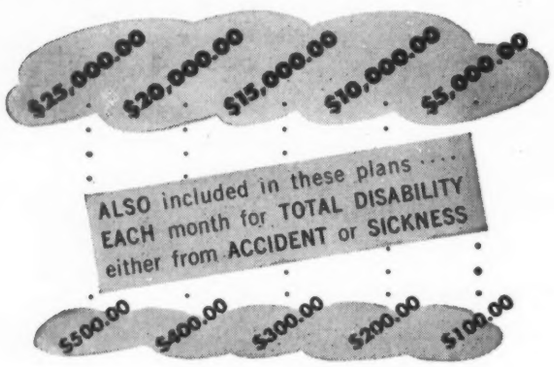

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HOSPITAL INSURANCE ALSO FOR OUR MEMBERS AND THEIR FAMILIES

$4,000,000 Assets
$20,000,000 Claims Paid
52 Years Old

Physicians Casualty & Health Ass'ns.
Omaha 2, Nebraska

(Continued from Page 366)

statement that 175 hospitals throughout the country have been provided for medical care of veterans. These hospitals cost more to build than private hospitals and three-fourths of the patients were admitted for non-service disabilities.

He called attention to the fact that now, since World War II, more and more veterans will be asking for this service and present hospitals will be overcrowded. He said that 17,000 patients every day are waiting to get into hospitals; that a great percentage of those admitted were mental cases; that there was not enough investigation; and that if a strict investigation were made many of the hospitals would be empty. He stated that in one check of patients, out of 22,600 only three were hospitalized for service disabilities. He said also that in a check it was found a large percentage of legitimate veterans were against hospital service to veterans who had only non-service disabilities.

Dr. Maxwell stated that one-sixth of the money spent for medical care in the United States is appropriated by Congress and that the time is coming when a check will have to be made on non-service disability so that at least those patients who are admitted to hospitals will pay part of the bill.

* * *

A joint meeting of the Western Michigan Pediatric Society and the Sunshine Sanatorium of Grand Rapids was held Wednesday, March 16, at Grand Rapids at the Sunshine Hospital. The meeting was under the co-chairmanship of H. D. Ireland, M.D., Grand Rapids, and John W. Thomson, M.D., Grand Rapids.

* * *

The Eighth Annual Michigan Rural Health Conference was held at Kellogg Center, East Lansing, on January 20, 21, and 22, 1955. This annual conference is financially sponsored by the Michigan Foundation for Medical and Health Education, and co-sponsored by more than 100 Michigan organizations interested in rural health improvement.

* * *

The University of Michigan School of Public Health offered the second Citizens Public Health Conference on March 3, 4, and 5, 1955. The meeting which took place at the School of Public Health in Ann Arbor was planned with the assistance of Citizens Groups and Official Agencies.

* * *

The Sixteenth Annual Clinic Day of the Mt. Carmel Mercy Hospital in Detroit was held Wednesday, January 26, 1955.

* * *

An editorial written by Harold Swanberg, M.D., Editor of the *Mississippi Valley Medical Journal*, concerns the appointment of J. P. Gray, B.A., M.D., M.P.H., of Detroit as Visiting Lecturer on Medical Writing of the American Medical Writers' Association.

(Continued on Page 370)

ELECTRON PHOTOMICROGRAPH

Escherichia coli 36,000 X

Escherichia coli ("colon bacillus") is a Gram-negative organism commonly involved in urinary tract infections and peritonitis, and is an important etiologic agent of otitis media, mastoiditis, enteritis, and septicemia in infants.

It is another of the more than 30 organisms susceptible to

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Bottles of 100.

Pads of directions sheets for patients available on request.

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(Continued from Page 368)

This editorial appeared in the January, 1955, issue of the *Mississippi Valley Medical Journal.*

* * *

F. Bruce Fralick, M.D., Ann Arbor, was a guest speaker at the Eighteenth Annual Meeting of the New Orleans Graduate Medical Assembly, in the field of Ophthalmology, held March 7-10, 1955.

* * *

Mobilization and Health Manpower.—In spite of expanding educational facilities to train health personnel, our national population growth and the rising level of demands for health services will cause a continuing shortage of health personnel "for many years to come," a health advisory committee to the Federal Government has predicted.

The report points out that the number of medical school graduates increased from 5,100 in 1940 to 6,800 in 1954 and is expected to reach 7,000 by 1960. The national population increase, however, has been so rapid that the overall 1960 ratio of physicians to population, the report predicts, will be 133 per 100,000 population as compared to 137 in 1950.

In view of this, the report concludes, it is probable that the total number of graduates will not increase materially for another five years.

* * *

A regional meeting of the Southern Region of the American College of Gastroenterology will be held in Memphis, Tennessee, on Sunday afternoon, April 24, 1955. The Scientific Session will be held in The Skyway, at the Hotel Peabody, commencing at 2:00 p.m., following the semi-annual meeting of the Board of Trustees of the College.

Lynn A. Ferguson, M.D., F.A.C.G., Grand Rapids, President of the American College of Gastroenterology, will preside.

* * *

The Professional Bureau of the American College of Radiology, directed by S. W. Donaldson, M.D., of Ann Arbor, assisted by Vincent C. Johnson, M.D., of Detroit, was created by the Board of Chancellors of the College to assist young members and residents in training in obtaining locations. This service, in contradistinction to that of commercial agencies, is 100 per cent free.

Briefly, the objectives of the Bureau are two: first, to aid the young radiologist to locate; and second, to assist the established radiologist in securing an associate.

* * *

A short intensive course on the laboratory diagnosis and pathology of parasitic infections will be presented August 15-27, 1955, at the Louisiana State University School of Medicine in New Orleans.

The course is designed primarily for pathologists and technologists. However, general practitioners, internists, pediatricians, gastroenterologists and physicians engaged in the practice of public health and tropical medicine who are interested in the laboratory diagnosis of parasitic infections are welcome to attend. The instruc-

tion and training will be of assistance to pathologists who are preparing for board examinations, to pathologists and physicians who are responsible for the diagnosis of parasitic infections in their laboratories and to technologists engaged in this specialty. Persons interested in attending this course may write to: Dr. Clyde Swartzwelder, Department of Microbiology, Louisiana State University School of Medicine, 1542 Tulane Avenue, New Orleans 12, Louisiana.

* * *

The American Board of Obstetrics and Gynecology announces that the next scheduled Examinations (Part II) oral and clinical for all candidates will be conducted at the Edgewater Beach Hotel, Chicago, Illinois, by the entire Board from May 12 through May 28, 1955. Formal notice of the exact time of each candidate's examination will be sent him in advance of the examination dates.

Further details may be procured from the Secretary, Robert L. Faulkner, M.D., 2105 Adelbert Road, Cleveland 6, Ohio.

CONFERENCE ON RHEUMATIC DISEASES
Wednesday, October 5, 1955
Ford Hospital, Detroit

A full day of meetings will be devoted entirely to the discussions of arthritis and allied diseases.

The meeting in sponsored by the Michigan Chapter, Arthritis and Rheumatism Foundation and Michigan Rheumatism Society.

The University of Illinois Department of Otolaryngology announces its Annual Assembly in Otolaryngology, September 19-October 1. For full information, write Francis L. Lederer, M.D., 1853 West Polk Street, Chicago 12, Illinois.

* * *

Duane L. Block, M.D., has been appointed physician in charge of medical services at the Ford Motor Company's Rouge plant, Dearborn, Michigan, succeeding Harley L. Krieger, M.D., who has been named special assistant to the medical director.

* * *

The American Academy of General Practice and Wyeth Laboratories, Inc., of Philadelphia, sponsored an international closed-circuit television symposium on "Management of Streptococcal Infection and its Complications" in fifty-eight cities of the United States and Canada on February 24. The Michigan outlet was Detroit. W. B. Hildebrand, M.D., Menasha, Wisconsin, AAGP President, moderated the panel of distinguished doctors of medicine.

* * *

Edgar E. Poos, M.D., Detroit, was guest speaker at the Aero Medical Association annual meeting, Washington, D. C., March 21-23. His subject was "Otological Problems Met in Aviators."

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In clinical trials, over 80% of cases have been cleared of the infection by one course of treatment with 'Antepar.'

* Bumbalo, T. S., Gustina, F. J., and Oleksiak, R. E.: J. Pediat. 44:386, 1954.

White, R. H. R., and Standen, O. D.: Brit. M. J. 2:755, 1953.

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"Ninety per cent of the children passed all of their ascarides . . ."

Brown, H. W.: J. Pediat. 45:419, 1954.

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CUMERTILIN Sodium Injection, 1- and 2-cc. ampuls, in boxes of 12, 25, and 100; and 10-cc. vials, individually and in boxes of 10 and 100.

1. Pollock, B. E., and Pruitt, F. W.: Am. J. M. Sc., 226:172, 1953.

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MICHIGAN WEEK—MAY 15-21, 1955

Dan Gerber of Gerber Products Company, Fremont, Chairman of the Michigan Economic Development Commission, recently stated: "Michigan Week will mean much to Michigan for the rest of the country to see Michigan people working together. It marks the beginning of a new era of pride and enthusiasm for Michigan on the part of Michigan people.

"The call to all Michigan citizens to take part in Michigan Week was made in a resolution by the Legislature adopted on the day Michigan Week was announced last February."

Doctors of medicine particularly are urged to become especially civic-minded during the weeks immediately preceding 1955 Michigan Week.

The Trudeau School of Tuberculosis will hold its forty-first annual session June 1-29. The course will cover all aspects of pulmonary tuberculosis and also certain phases of other chronic chest diseases, including those of occupational origin. The tuition fee is $100.00. For complete program write the Trudeau School, Box 200, Trudeau, New York.

* * *

THE JOURNAL of the Michigan State Medical Society totaled 1,586 pages in the year 1954, compared to 1,536 during the previous year. The increase was due mainly to additional advertising pages. The popularity of JMSMS continues to rise year after year, not only among its medical subscribers, but with the profession's friends in the advertising field.

* * *

W. Earl Posser has been appointed Executive Director of the United Health and Welfare Fund of Michigan, with headquarters at 474 Hollister Building, Lansing 8. Mr. Posser was chosen for this important job by the Personnel Committee of the Fund, of which Warren B. Cooksey, M.D., Detroit, is chairman.

* * *

The International College of Surgeons, through its Woman's Auxiliary, offers a scholarship to a young American or Canadian surgeon who wishes to study abroad. The scholarship totals $3,000 to pay for living expenses and transportation for a period of twelve months. For information and application blank write the Scholarship Committee, 1516 Lakeshore Drive, Chicago 10.

* * *

The American Goiter Association will hold its 1955 Annual Meeting at the Skirvin Hotel, Oklahoma City, Oklahoma, April 28-30. For program write John C. McClintock, M.D., Secretary, 149½ Washington Avenue, Albany, New York.

* * *

Carl V. Weller, M.D., Ann Arbor, Professor of Pathology and Chairman of the University of Michigan Department of Pathology, presented the annual Beaumont Lecture of the Wayne County Medical Society on

(Continued on Page 374)

ELECTRON PHOTOMICROGRAPH

Streptococcus pyogenes 36,000 X

Streptococcus pyogenes is a Gram-positive organism commonly involved in a great variety of pathologic conditions, including

scarlet fever • tonsillitis • pharyngitis • otitis media • sinusitis
bronchopulmonary disease • pyoderma • empyema • septicemia • meningitis
mastoiditis • vaginitis • rheumatic fever • acute glomerulonephritis

It is another of the more than 30 organisms susceptible to

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537 Millard St.
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The pathologist in direction is recognized by the Council on Medical Education and Hospitals of the A.M.A.

(Continued from Page 372)

February 7 in Detroit. The WCMS Beaumont Lecture, in memory of Dr. William Beaumont, was established in 1922.

* * *

The Michigan Academy of General Practice presented its Second Symposium on Office Procedures for the General Physician at the Sheraton-Cadillac Hotel, Detroit, on February 9. This year's symposium was co-sponsored by the Wayne County Academy of General Practice and the Wayne County Medical Society and included the following speakers: Walter A. Fansler, M.D., Minneapolis; George D. Geckeler, M.D., Philadelphia; Edwin W. Burton, M.D., Charlottesville, Va.; E. J. McCormick, M.D., Toledo; Sherman Little, M.D., Buffalo; Isadore Dyer, M.D., New Orleans; and Philip A. Tumulty, M.D., Baltimore. Kenneth W. Toothaker, M.D., of Lansing is President of the MAGP.

* * *

Speakers on cancer control, arranged under the auspices of the Michigan Cancer Co-ordinating Committee, include:

J. Clinton Foshee, M.D., Grand Rapids, before the Allegan County Medical Society, December 14. Subject. "Early Recognition and Management of Cancer of the Stomach."

Richard A. Rasmussen, M.D., Grand Rapids, before

(Continued on Page 376)

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Wartenberg Pinwheel

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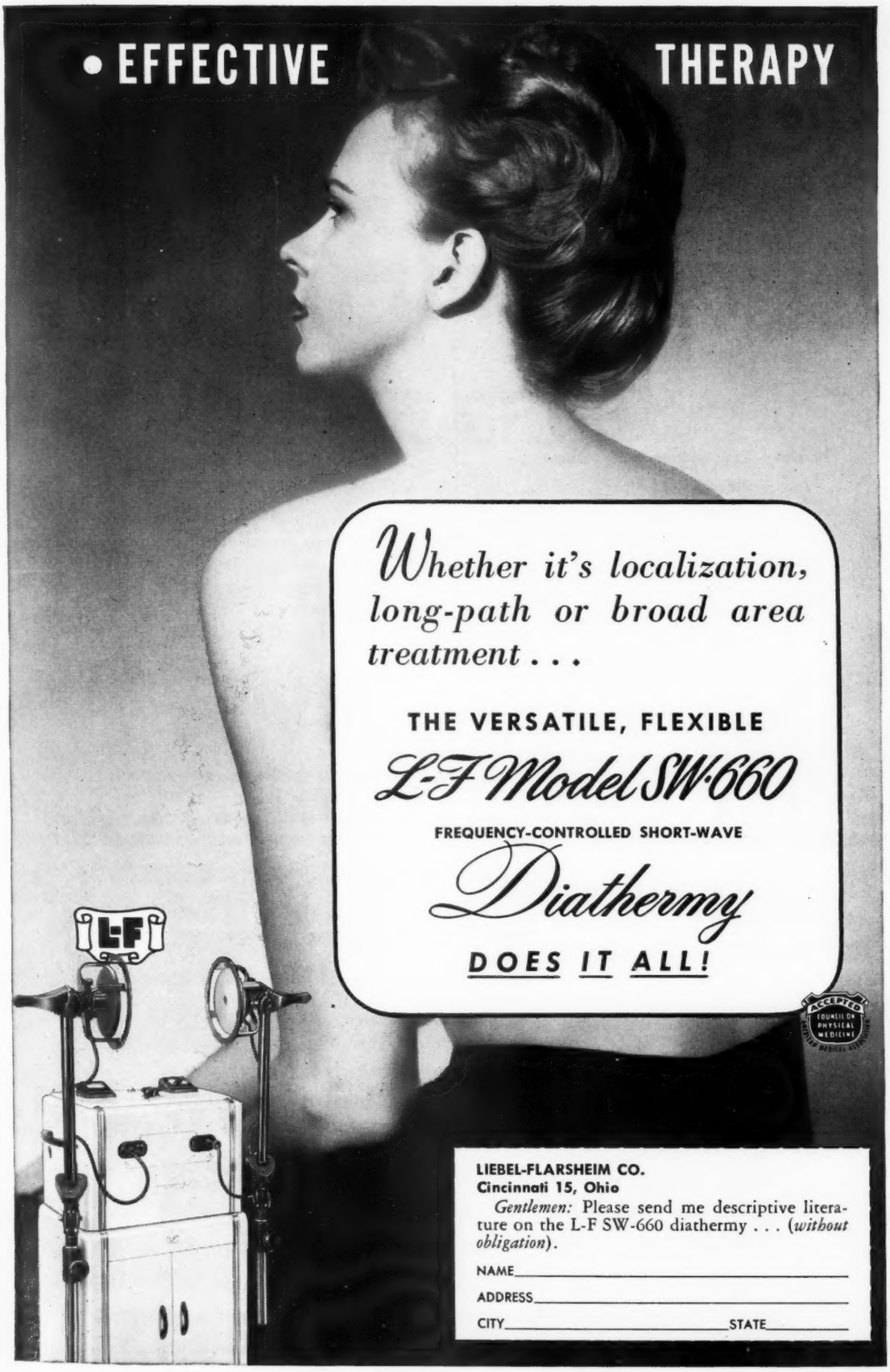
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(Continued from Page 374)

the Bay-Arenac-Iosco County Medical Society, November 10. Subject: "Early Recognition and Management of Tumors of Thoracic Cavity."

Mahlon S. Sharp, M.D., Lansing, before the Shiawassee County Medical Society, January 11. Subject: "Cancer of the Uterus."

James H. Beaton, M.D., Grand Rapids, before the Gratiot-Isabella-Clare County Medical Society, February 15. Subject: "Management of Carcinoma of the Uterine Cervix."

* * *

Theodore G. Klumpp, M.D., President of Winthrop-Stearns, Inc., of New York City, and guest speaker at the 1955 Michigan Clinical Institute on the title "Pharmaceutical Manufacturer and Physician—Partners in Progress," has just been appointed to the twelve-member National Advisory Council on Vocational Rehabilitation, established under the Vocational Rehabilitation Act (Federal) of 1954.

Congratulations, Dr. Klumpp!

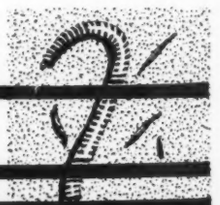
* * *

A summer camp for diabetic children will be opened for the seventh season under the auspices of the Chicago Diabetes Association, Inc., from July 17 to August 7, 1955, at Holiday Home, Lake Geneva, Wisconsin.

In addition to the regular personnel of the camp, the Chicago Diabetes Association will furnish a staff of

(Continued on Page 378)

WORMS MAKE NO SOCIAL DISTINCTION....



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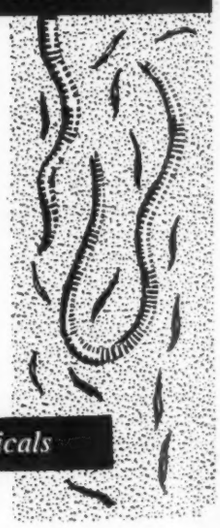

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DOCTOR, here's a question and an answer you may find useful when patients ask about cigarettes:

What do Viceroys do for you that no other filter tip can do?

These filter traps, doctor, are composed of a pure white non-mineral cellulose acetate. They provide maximum filtering efficiency without affecting the flow of the smoke.

And, in addition, they enhance the flavor of Viceroy's quality tobaccos to such a degree that smokers report they taste even better than cigarettes without filters.

King-Size Filter Tip **VICEROY**

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ONLY A PENNY OR TWO MORE THAN CIGARETTES WITHOUT FILTERS

(Continued from Page 376)

resident physicians and dietitians, trained in the care of diabetic children.

Boys and girls, ages eight through fourteen years, are eligible. For further information regarding fees, interested persons should be directed to write or phone the office of the Chicago Diabetes Association. Fees will be set on a sliding scale to meet individual circumstances.

Physicians are requested to notify parents of diabetic children and to supply the names of children who would like to attend camp. Applications may be obtained from, and inquiries should be addressed to: The Chicago Diabetes Association, 5 South Wabash Avenue, Chicago 3, Illinois. Telephone Andover 3-1861.

Limited capacity requires prompt application.

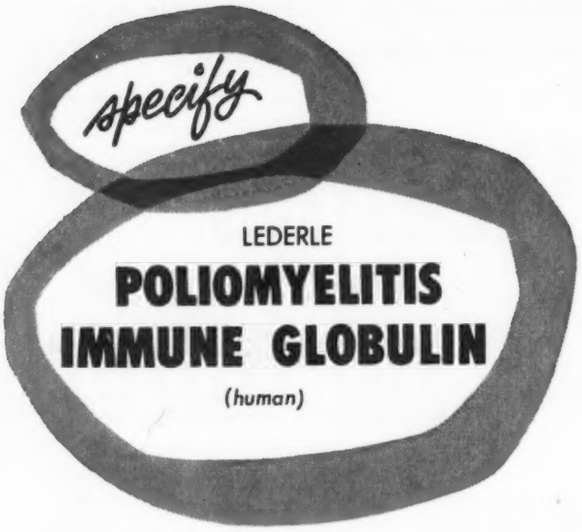
* * *

Wm. M. LeFevre, M.D., of Muskegon, Councilor of the MSMS Eleventh District, addressed the Barry County Medical Society on "Periodic Health Appraisal" on March 15, as representative of the MSMS Periodic Health Appraisal Committee

* * *

John R. Rodger, M.D., Bellaire, spoke on "Periodic Health Appraisal and What It Means to You and Your Patients" before the Delta-Schoolcraft County Medical Society, Escanaba, March 29, as official representative of the MSMS Committee on Periodic Health Appraisal

(Continued on Page 380)



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(Continued from Page 378)

Plan. Dr. Rodger was chairman of this MSMS committee in 1954.

* * *

"Family Doctor—Model 1955" is the title of an interesting and informative article by Dr. Paul deKruif of Holland, Michigan, which appeared in the February *Reader's Digest*. The story is a digest of a deKruif article which appeared originally in "GP," the official publication of the American Academy of General Practice, issue of January, 1955.

The RD "Model" mentioned the following Michigan practitioners: J. R. Rodger, M.D., Bellaire; G. B. Saltonstall, M.D., Charlevoix; and J. S. DeTar, M.D., Milan.

* * *

The Philadelphia Regional Committee on Trauma of the American College of Surgeons announces a three-day Fracture Course by Dr. Lorenz Bohler, Vienna, Austria, and Dr. Jorg Bohler, Linz, Austria, on April 21, 22 and 23, 1955, at the College of Physicians of Philadelphia, 19 South 22d Street, Philadelphia 3, Pa. Each day's sessions will last from 9 A.M. to 12 noon and 2 P.M. to 5 P.M. The course will be supplemented with discussions by outstanding American fracture surgeons.

Reservations for the course will be strictly limited to

(Continued on Page 382)

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(Continued from Page 380)

400. The fee for practicing physicians will be $50.00 and for residents, interns and medical students $25.00. Application blanks may be secured by writing to William T. Fitts, Jr., M.D., Secretary-Treasurer, Philadelphia Regional Committee on Trauma, 301 South 21st Street, Philadelphia 3, Pa.

* * *

The Eleventh Annual Congress and Graduate Instructional Course in Allergy of The American College of Allergists will be held at the Morrison Hotel in Chicago, Illinois, April 25 through the 30th. The first three days will be devoted to 40 hours of intensive teaching of the basic facts in this field of medicine. These courses will be conducted by 45 specialists well known for their teaching ability and mostly chosen from the medical college faculties throughout the nation. These courses are designed to guide and stimulate physicians beginning to recognize the importance of applying present-day knowledge to their practices. This instruction will attract and hold the interest of physicians in general practice who are finding that more than 5 per cent of the people who consult them do have an allergic component in their illness.

The growing importance of drug and serum allergies will be emphasized that the more severe and fatal cases may be avoided. Those who attend will be taught how to be on the lookout for the more severe reactions in the hypersensitive patient and the danger that is ever present when chemical therapeutic agents are used.

The last two days will be devoted to more advanced clinical papers and to reports of research and investigations. The Annual Oration of the College will be given this year by Robert A. Cooke, M.D., Director of The Institute of Allergy at The Roosevelt Hospital, New York City, and one of the great pioneers in the field. His subject will be: "Medical Research in the Field of Allergy."

Michigan doctors participating are George Waldbott, M.D., Detroit; L. Dell Henry, M.D., Ann Arbor; Rudolf E. Wilhelm, M.D., Dearborn. Co-authors with Dr. Wilhelm are Osborne A. Brines, M.D., Detroit, and Elmer R. Jennings, M.D., Detroit.

Any member in good standing of his local county medical society is cordially invited to attend. Further details and the program may be obtained by writing American College of Allergists, LaSalle Medical Building, Minneapolis 2, Minnesota.

* * *

Conference on Anesthesiology.—Wayne University College of Medicine offers a comprehensive unit course in anesthesiology on April 21-23, 1955. The course, a series of didactic preparations and panel discussions and related subjects, is intended primarily for the part-time anesthetist or general practitioner seeking anesthesia.

(Continued on Page 384)

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(Continued from Page 382)

Experts in the field of anesthesiology will present the lectures; adequate time will be allowed for discussion. The last day of the session will be devoted to a round table dealing with particular problems in anesthesiology presented by the registrants. Fee $40. For complete program and further information, write F. E. Greifenstein, M.D., Professor of Anesthesiology, Wayne University College of Medicine, 1401 Rivard, Detroit.

* * *

The Northern Tri-State Medical Association (Michigan, Indiana, Ohio) will hold its 82nd annual meeting at Fort Wayne, Indiana, on April 5. Speakers include: T. T. Meyers, M.D., of Rochester, Minnesota; Albert Stump, Indianapolis, Indiana, attorney for Indiana State Medical Association; J. P. Revenaugh, Chicago, Illinois, public relations expert; Robert Kark, M.D., Chicago; and Leon J. Witkowski, M.D., Chicago.

Herbert Philbrick, author of the book "I Led Three Lives," will address the Association on "Red, Pink, and White." For program and detailed information, write T. D. Armstrong, M.D., 120 West Ninth Street, Michigan City, Indiana.

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with ulcerative colitis,
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* See MORRISON: Rev. of Gastroent., Oct. 1953.

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The Michigan Alcoholic Rehabilitation Foundation is a non-profit organization devoted to the proper hospitalization of alcoholics seeking to stop drinking.

Contributions to the Foundation are deductible and should be sent to 2379 National Bank Bldg., Detroit 26, Michigan.

THE DOCTOR'S LIBRARY

Acknowledgment of all books received will be made in this column, and this will be deemed by us as full compensation to those sending them. A selection will be made for review, as expedient.

FLUID AND ELECTROLYTE THERAPY. By Franklin L. Ashley, B.S., M.S., M.D., Assistant Professor of Surgery, University of California Medical Center, Los Angeles, and Horace G. Love, B.S., M.D., Dallas, Texas. Philadelphia, London, Montreal: J. B. Lippincott Company, 1954. Price $3.00.

ENDEMIC GOITER. The Adaption of Man to Iodine Deficiency. By John B. Stanbury, M.D., Gordon L. Brownell, Ph.D., Douglas S. Riggs, M.D., and Hector Perinetti, M.D., Juan Itoiz, Ph.D., and Enrique B. Del Castillo, M.D. Cambridge, Massachusetts: Harvard University Press, 1954. Price $4.00.

THE ATOM STORY. Being the Story of the Atom and the Human Race. By J. C. Feinberg, M.Sc. Illustrations by Lewis. Foreword by Frederick Soddy, F.R.S. New York: Philosophical Library, 1954. Price $4.75.

SURGICAL CARE — PREOPERATIVE AND POSTOPERATIVE. By Raymond W. McNealy, M.D., and Jacob A. Glassman, M.D.

CLINICAL DIAGNOSIS BY LABORATORY METHODS A WORKING MANUAL OF CLINICAL PATHOLOGY. Twelfth Edition. By James Campbell Todd, Ph.B., M.D., late Professor of Clinical Pathology, University of Colorado School of Medicine; Arthur Hawley Sanford, A.M., M.D., Emeritus Professor of Clinical Pathology, the Mayo Foundation, University of Minnesota; Emeritus Member, Division of Clinical Laboratories, the Mayo Clinic; Director of Laboratories, Rochester State Hospital; and Benjamin B. Wells, M.D., Ph.D., Professor of Medicine, Department of Medicine, School of Medicine, University of Arkansas. 946 illustrations: 197 in color, on 403 figures. Philadelphia: W. B. Saunders Co., 1953. Price $8.50.

BALLISTOCARDIOGRAPHY. The Application of the Direct Ballistogardiograph to Clinical Medicine. By William Dock, B.S., M.D., F.A.C.P., Professor of Medicine, State University Medical Center at New York City, College of Medicine; Visiting Physician, Kings County Hospital, Brooklyn; Consultant in Medicine, Veteran's Administration Hospital at Brooklyn; Harry Mandelbaum, M.D., F.A.C.P., Lecturer, State University Medical Center at New York City, College of Medicine; Associate in Medicine, The Jewish Hospital of Brooklyn; Physician in Charge, Hypertension and Nephritis Clinic at the Jewish Hospital of Brooklyn; Attending in Medicine, The Jewish Sanitarium and Hospital for Chronic Diseases, Brooklyn; Attending in Medicine, Brooklyn Hebrew Home and Hospital for the Aged, Brooklyn and Robert A. Mandelbaum, B.A., M.D., Assistant in Medicine, the Jewish Hospital of Brooklyn; Adjunct in Medicine, The Jewish Sanitarium and Hospital for Chronic Diseases, Brooklyn; Assistant in Cardiology, Beth-El Hospital, Brooklyn. With 153 illustrations. St. Louis: The C. V. Mosby Co., 1953. Price $9.50.

(Continued on Page 388)

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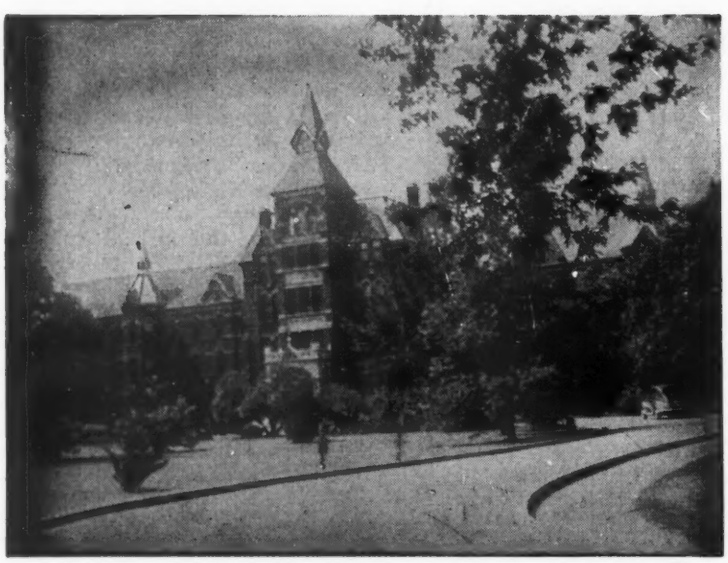
ST. JOSEPH'S RETREAT



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(Continued from Page 386)

THE RAUWOLFIA STORY. From Primitive Medicine to Alkaloidal Therapy. 64 pages. Summit, New Jersey: Ciba Pharmaceutical Products, Inc., 1954.

This very readable little book tells of the recognition and introduction into usage of a drug very much in demand.

THE SCOURGE OF THE SWASTIKA. A Short History of Nazi War Crimes. By Lord Russell, Liverpool C.B.E., M.C. 16 pages of half-tone illustrations. New York: Philosophical Library, 1954. Price $4.50.

This book is a very exact and descriptive treatise on the subject of mass murder, extermination of whole groups and some experimental work. It depicts scenes in many death chambers in areas where hundreds of thousands were put to death.

CLINICAL ASPECTS OF THE AUTONOMIC NERVOUS SYSTEM. By L. A. Gillilan, Ph.D., M.D., Associate Professor of Anatomy, Graduate School of Medicine, University of Pennsylvania. With 42 illustrations by the author. Boston-Toronto: Little, Brown and Company, 1954. Price $6.50.

Though books and papers on the autonomic nervous system have been of some interest to the man in active clinical practice, their appeal has not been great. Part of this has been due to the fact that they were expositions of the anatomy or reviews of the physiology with little emphasis on the clinical aspect. This volume is an exception to the usual rule. That portion of the book which presents the anatomy is written with a view to the clinical approach.

The second portion of the book is quite frankly and directly clinical and can be used easily and quickly for reference.

On the whole, the book is well written, easy to read and well arranged for reference. It should be of considerable value in the handling of psychosomatic symptoms and disorders.

F.O.M.

GERIATRIC MEDICINE, Medical Care of Later Maturity. Edited by Edward J. Stieglitz, M.S., M.D., F.A.C.P., Consulting Internist, Suburban Hospital, Bethesda, Maryland and Washington Home for Incurables; Chairman of Staff, 1945-1947. Suburban Hospital Bethesda, Maryland; Consultant in Geriatrics, Chestnut Lodge, Rockville, Maryland, St. Elizabeth's Hospital and Veterans Administration; Associate, Washington School Psychiatry; Lecturer in Industrial Medicine, New York University—Bellevue Post-Graduate Medical School; Chairman, Advisory Council on Professional Education, Commission on Chronic Illness; Consulting Editor, *Geriatrics;* Formerly Associate Clinical Professor of Medicine, Rush Medical College, University of Chicago. Third Edition, 205 Figures. Philadelphia, London, Montreal: J. B. Lippincott Company. Price $15.00.

This book on geriatrics is well organized. The problems of the aging are discussed under eight sections and each

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Surgical Technic, Surgical Anatomy and Clinical Surgery, four weeks, June 6.
Surgical Anatomy and Clinical Surgery, two weeks, March 21
Surgery of Colon and Rectum, one week, April 11.
Basic Principles in General Surgery, two weeks, March 28
General Surgery, two weeks, April 25; one week, May 23.
Gallbladder Surgery, ten hours, April 11
Fractures and Traumatic Surgery, two weeks, June 13.
GYNECOLOGY—Office and Operative Gynecology, two weeks, April 18.
Vaginal Approach to Pelvic Surgery, one week, May 2.
OBSTETRICS—General and Surgical Obstetrics, two weeks, March 28.
MEDICINE—Two-week Course, May 2.
Electrocardiography and Heart Disease, two weeks, July 11.
Gastroenterology, two weeks, May 16
Dermatology, two weeks, May 9—
Hematology, one week, June 13.
RADIOLOGY—Diagnostic Course, two weeks, May 2.
Clinical Uses of Radio Isotopes, two weeks, May 2.
Radium Therapy, one week, May 23.
PEDIATRICS—Intensive Course, two weeks, April 4
Clinical Course, two weeks, by appointment
Cerebral Palsy, two weeks, June 20.
UROLOGY—Two-week Urology Course, April 18
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section is subdivided into special fields in the practice of medicine.

The forty-eight contributors to this volume stress the fact that geriatric medicine covers a much broader field than the care of senile people; it covers the management and care of the senescent patients, and senescence begins at forty.

Section one is devoted to the basic considerations of the aging; section two takes up disorders of metabolism; three, four, and five deal with disorders of the nervous, respiratory, and circulatory systems; sections six, seven and eight give a discussion of the disorders of the alimentary, genitory, and skeletal systems.

Particularly interesting are chapters six, seven, and eight of Section 1, which deal with the medical care of normal senescent mental hygiene in later maturity and medical care of normal aged, as are Chapters 27 and 28, Section V dealing with angina pectoris, myocardial infarction, acute coronary failure, and arteriosclerosis.

This book deserves a place in any doctor's library, regardless of his specialty.

CORRELATIVE NEUROSURGERY. By Edgar A. Kahn, Robert C. Bassett, Richard C. Schneider, Elizabeth Caroline Crosby. Contributors: Basu K. Bagchi, Jere M. Bauer, John M. Converse, William T. Correa, Russell N. DeJong, Robert G. Farris, David G. Freeman, John F. Holt, Tryphena Humphrey, Henry R. Pantek, Carl F. List. Foreword by Kenneth G. McKenzie, M.B., Toronto, F.R.C.S.(C), Consulting Senior Surgeon to the Toronto General Hospital; recently in charge of the Division of Neurosurgery in the Toronto General Hospital. Springfield, Illinois: Charles C Thomas, 1954. Price $19.50.

A medical book occasionally appears which gives the reader the impression that it is the product of a very rich and varied clinical experience on the part of the author or authors. Such a book is Correlative Neurosurgery by Dr. E. A. Kahn and associates at the University of Michigan. The various problems in neurosurgery are discussed concisely and with admirable simplicity and honesty. The authors are to be commended particularly for the manner in which they have emphasized the practical rather than the theoretical elements in the various neurological problems. This reviewer has never seen more striking illustrations and diagrams that are so distinct and easily understood. Another outstanding feature is the result obtained by the close cooperation of the anatomists with the clinician in this work. Each has benefited and so helped attain a better product for the reader. Considering all of the elements in this outstanding work, one cannot help but think that this book should be on the shelf of every young neurosurgeon entering private practice.

Dr. Max M. Peet, with his brilliant and infinitely fine technique, was the mentor of the author and most of his associates, and it is to Dr. Peet that the book is dedicated. He would be proud if he could return and see what his erstwhile pupil and associates have accomplished. The pupil who once learned at the master's knee, so to speak, has reached the stature of the master.

R.L.M.

Say you saw it in the Journal of the Michigan State Medical Society

TUBERCULOSIS HOSPITALS LIST EMPTY BEDS

Michigan has 740 vacant beds for tuberculosis patients and 2,976 unhospitalized cases of active tuberculosis known to local health officers, according to a report from the Health Department.

The hospital-patient census December 31, 1954, listed 4,331 victims being treated. There were 101 Detroit patients awaiting admission to hospitals.

The state has a total of 4,565 acceptable beds in hospitals already staffed, mostly in areas remote from Detroit. The Health Department listed 506 additional beds which would be acceptable for patients if the hospitals were properly staffed and remodeling were completed.

The department reported that the number of "unacceptable" beds had dropped from 840 to 430 in the last year. It will be reduced further when the Detroit Chest and General Hospital is closed to tuberculosis cases.

The showing of unoccupied "acceptable" beds at a time when there are 2,976 unhospitalized active cases emphasized criticism that the hospital building program has followed pork-barrel patterns.

It indicates also that little use has been made of the law passed in the last legislative session providing for compulsory hospitalization of "active" tuberculosis cases where the patient may be regarded as exposing others to infection.

Communications

Dr. William M. LeFevre
606 Hackley Building
Muskegon, Michigan

Dear Bill:

Thank you for sending me THE JOURNAL of the Michigan State Medical Society. This really gives diabetes an excellent boost, and I congratulate you on your efforts.

I trust that I shall see you sometime in the near future. Perhaps you are going to the Postgraduate Clinic in Philadelphia. I hope so.

With best wishes for the New Year, I am

Cordially yours,
H. B. MULHOLLAND, M.D.

University of Virginia
Charlottesville, Va.
January 10, 1955

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$2.50 per insertion of fifty words or less, with an additional five cents per word in excess of fifty.

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MICHIGAN'S DEPARTMENT OF HEALTH

(Continued from Page 362)

WEIGHT CONTROL COLLOQUIUM

A summary of the main points stressed at the Weight Control Colloquium held at Iowa State College on January 18 to 20 are available from the Michigan Department of Health to any physicians interested.

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